

INTRODUCTION TO
ECONOMIC ANALYSIS



ECONOMICS AND SOCIAL INSTITUTIONS

VOLUME I

Development of Economic Society

by MODLIN and DEVYVER

VOLUME II

Introduction to Economic Analysis

by McISAAC and SMITH

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ECONOMICS AND SOCIAL INSTITUTIONS

Volume II

INTRODUCTION
TO
ECONOMIC
ANALYSIS

by

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PREFACE

THIS is the second volume in a six-book series designed to serve, in various combinations, as a text for an introductory course in Economics. The first volume, *Development of Economic Society*, gives the student a broad perspective of the development and operation of economic and social institutions. This book, in turn, acquaints him with the fundamental tools of economic analysis. The remaining four volumes in the series present a survey of the major problems of the modern economic system. In each of these books the emphasis is placed not merely on the description of economic problems, but also on the study of underlying economic and social processes.

Volume II, *Introduction to Economic Analysis*, is offered to teachers and students in elementary economics courses with the hope that it may help to close the gap that frequently appears to exist between economic theory and real economic life. This divergence of theory from reality is largely a consequence of the usual assumption, conventionally made for purposes of analysis, that conditions of pure competition prevail throughout the economic system. In the present volume the authors have avoided this unrealistic assumption and, instead, have recognized the existence of monopolistic elements throughout modern economic society.

The analysis of the operation of the entire price system has, therefore, been carefully related to the theory of price adjustment under conditions of monopoly or monopolistic competition. It is thus possible for the student to proceed directly to the study of the problems of price and production in actual industrial life, without making fundamental qualifications in the structure of theoretical analysis. This approach has been employed consistently throughout the analysis of the conditions affecting the prices of both consumers' goods and producers' goods. Explicit consideration is given to the influence of monopolistic conditions in the determination of wages, rent, interest, and profits.

Full use has also been made of the recent developments in marginal analysis that have appeared in the economic journals and monographic literature. Indeed, one of the chief objectives of the authors has been to make available to elementary students, in a systematic, concise, and simplified form, some of the important contributions to economic analysis that have been made in recent years. Marginal analysis, as developed in these recent contributions, has been adapted by the authors in such a manner as to make possible the presentation of a unified treatment of the entire price system.

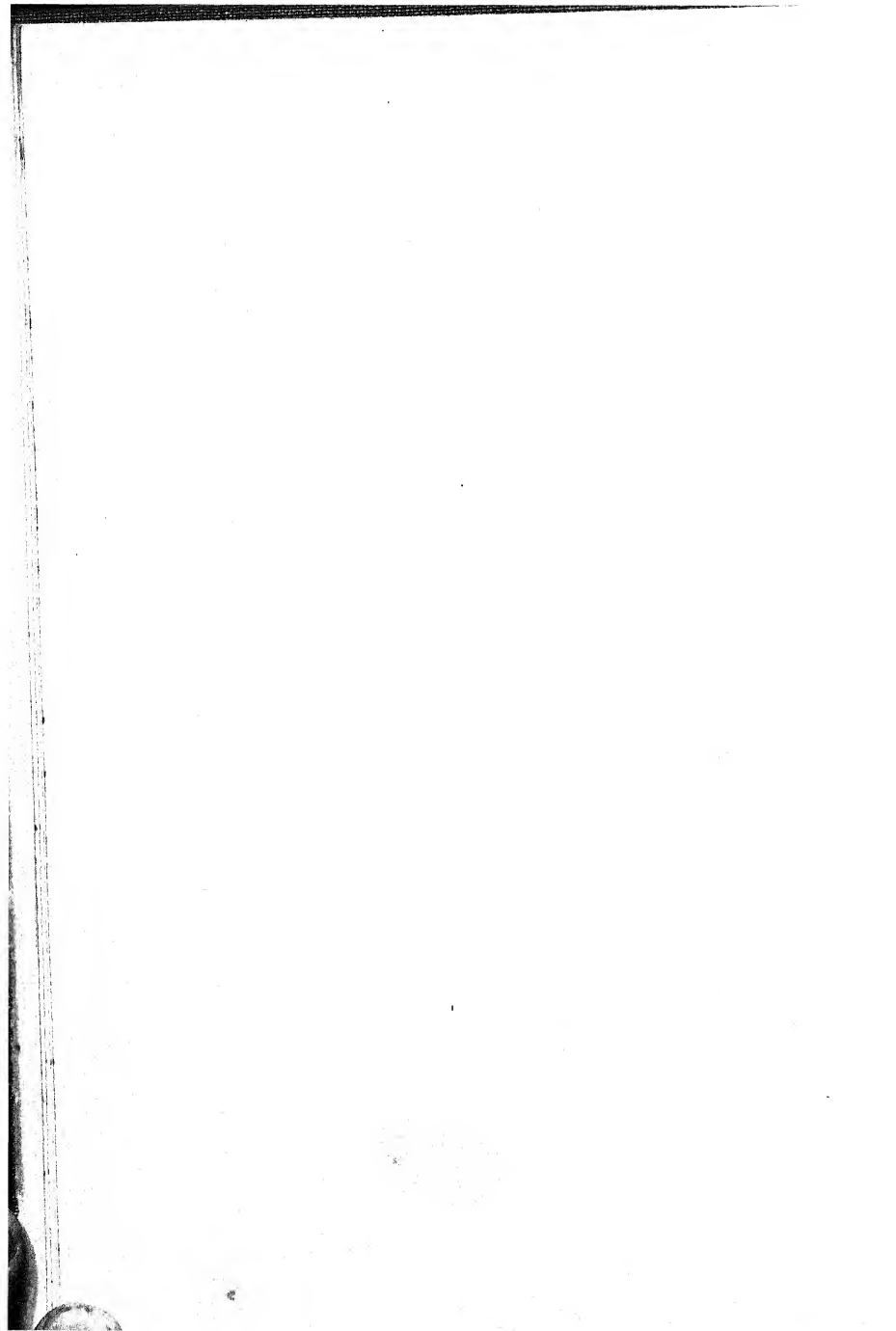
In carrying out this project the authors have benefited greatly from the help, encouragement, and criticisms of many colleagues and friends. The authors gratefully acknowledge the many constructive criticisms and the friendly co-operation offered by the instructors in Economics A at Harvard University, where a preliminary edition of the text was used during 1936-1937. They

are also greatly indebted to the instructors and students of the course in Economics 201-202 at Princeton during 1936-1937, whose numerous suggestions and criticisms of the preliminary edition have guided the preparation of this book.

A special word of thanks and appreciation is voiced for the advice and suggestions of those who read and criticized parts or all of the manuscript, both of the preliminary edition and of the present text. Among these are Professor E. H. Chamberlin and Dr. J. P. Miller of Harvard University, Mr. R. F. Bryan of Yale University, and Dr. A. J. Duncan and Dr. E. S. Lynch of Princeton University.

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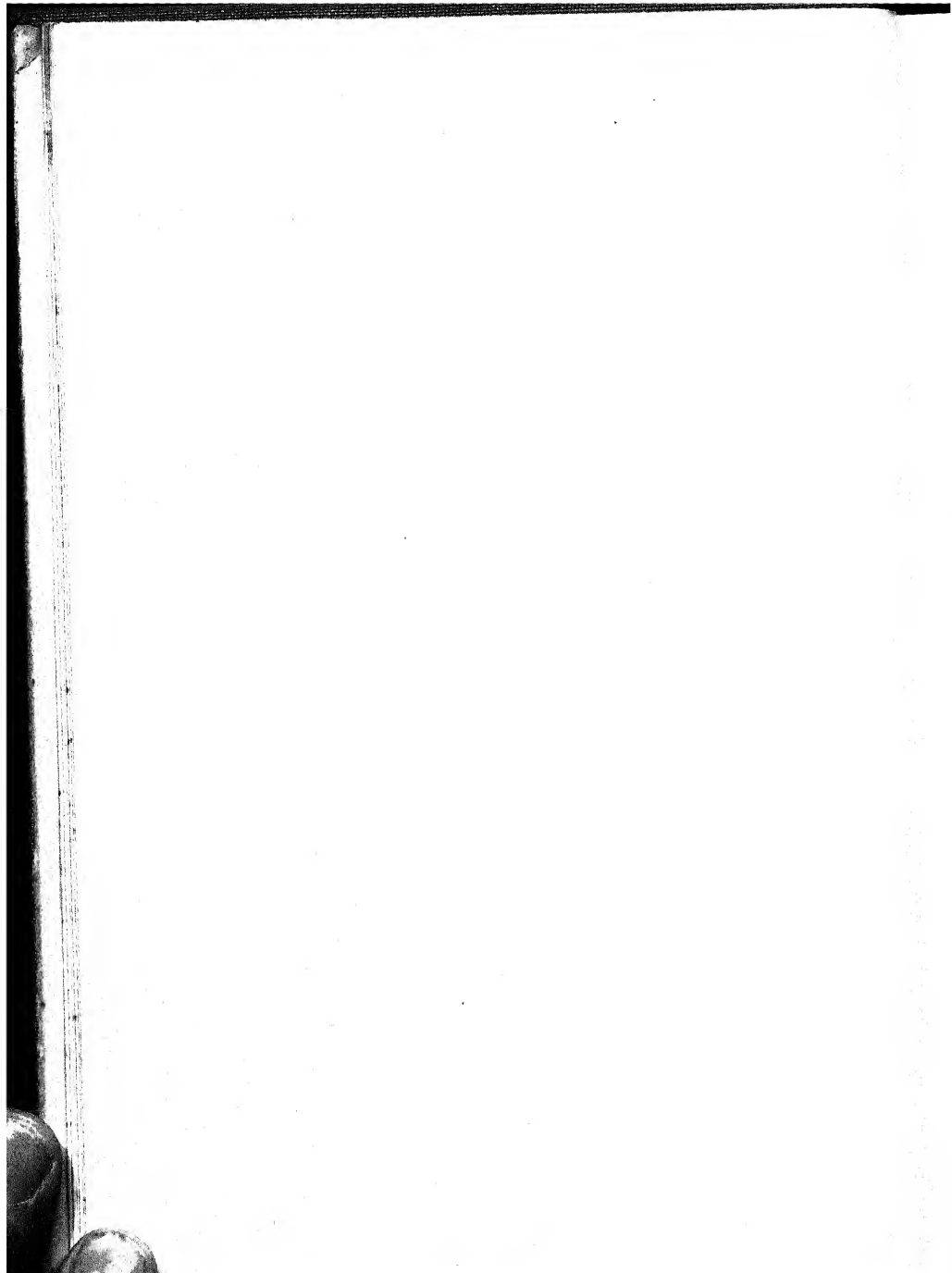
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INTRODUCTION TO
ECONOMIC ANALYSIS



CHAPTER I

Nature and Purpose of Economic Analysis

ECONOMIC ACTIVITIES

Desires and Scarcity. Despite the vaunted wonders of scientific progress and the miracles of the modern machine age, men do not yet live in an "economy of abundance." The vast majority of people, on the contrary, still find their capacity to lead the "full life" strictly limited by the lack of many things that are necessary to minister to their manifold needs or desires. Nor is there much likelihood that these limitations on the resources at man's command will ever be fully relaxed; no small share of his thought and effort will doubtless always be concerned with the provision for his ever-recurrent desires.

Definition of Economics. It is with this phase of human life that economics is concerned, and especially with the activities and relationships that bear upon the efforts of people to make provision for their desires. To

be sure, not all human desires are dependent, for their satisfaction, on the possession of goods or claims upon the services of other people. The expression of religious feeling, the satisfaction of the interest in play or sport, the pleasures of friendship and of the family circle, do not always make direct demands upon the material environment. Thus, not all desires are of economic significance, although there are few phases of life that are not dependent, at least indirectly, upon economic activities.

The study of economics is, basically, a study of the problems of scarcity. Whether it is defined as the "science of wealth", as "the study of man earning a living", or as "the study of the allocation of scarce means to human ends", economics is concerned with problems that result from the scarcity of the means of satisfying desires. The twin factors, human desire and scarcity, constitute the foundations of economic life.

Significance of Production. Economic activities reflect the efforts of individuals and groups to extend their command over the goods and services they must have in order to meet their desires. The progress of civilization from primitive times represents, in large part, the gradual increase in the ability of men to convert the objects of the natural environment into forms that are more capable of satisfying desires. Primitive man depended on the wild fruits of nature for his scanty fare. With the fashioning of the first crude weapons, and with the first tilling of the soil, began the long march of technical progress in the conversion of nature's riches to the meeting of human needs.

Those processes by which human effort is expended

in order to increase the sum of goods and services capable of satisfying the desires of men constitute *production*. Most of the complications of modern economic life arise out of the fact that, with the progress of civilization, production has come to be carried on as a social process. The individual is no longer limited by the meagerness of his own powers, but can combine his strength and abilities with those of his fellows to gain a more abundant product. At the same time, the economic and social relationships among the people making up the community have become much more intricate. They are interconnected by a maze of rights, duties, obligations, and claims against each other and against the common product of their combined efforts. The definition, regulation, and enforcement of these relationships become matters of social custom or formal law. The special task of the economist is to analyze the operation of the system by which the common interest in production is served.

ECONOMICS AS A SOCIAL SCIENCE

Relation to Other Social Sciences. Economics belongs in the general classification of the social sciences because it is concerned with human activities, relationships, and institutions. It differs from other social sciences in that it concentrates attention on those activities, relationships, and institutions that play a part in the *economic* life of people. It differs from the other social studies, also, in that it accepts as facts, in the background of economic life, some things that are the direct object of investigation in other sciences.

From the standpoint of the economist, for example,

it is possible and reasonable to assume that people have desires, without stopping to consider what desire is, or why it exists. The latter problems fall within the domain of the psychologist and the philosopher. Likewise, the economist takes for granted the tendency of people to form social groups or organizations for the attainment of purposes that they have in common, without attempting to duplicate the work of the sociologist or anthropologist, who is specifically concerned with exploring the forces that produce social cohesion in group life.

Obviously, there is a great deal of common ground to be covered by the social sciences, each from its own special point of view, and each one has much to contribute to the other sciences. The economist, for example, is interested in history, because it helps to explain the development of the institutions through which economic life functions. He is interested in the conditions leading to the formation of certain types of social groups, whether they be business organizations, trade unions, or other forms of association, because such groups tend to modify the direction and pressure of economic forces. He is increasingly interested in the theories and practices of political organizations because modern societies are tending to bring many phases of economic life under organized social control. But in each case the economist's interest in allied sciences arises from their contribution to the study in which he is primarily interested; namely, the understanding and evaluation of the processes, relationships, and problems of the modern economic world.

Social Institutions. In the social sciences the term "institution" is applied to any sort of organized arrangement under which the people in a social group live and conduct their affairs. These arrangements exist by the sanction of social custom and may also enjoy the support of law, which is itself a social institution. For example, family relationships, taken collectively, constitute the institution of the family. In the same way, marriage, as an arrangement enjoying social sanction, is regarded as a social institution.

Economic institutions include those social relationships or arrangements among the people of a community that constitute the social setting within which the economic processes of life are carried on. The institution of private property, for example, is a social arrangement that permits the individual to assert exclusive rights to control and dispose of certain objects or services. More highly organized arrangements for the conduct of economic life include the complex organizations by which production, marketing, financial activities, and business generally are carried on. The term "institution" thus covers a great diversity of relationships, all of which, however, are alike in that they serve, in one way or another, to express the *group* aspects of life and to define the positions of the individual in each of the important groups of which he is a part.

The classification of institutions as social, economic, financial, political, or religious, does not mean that these groups are mutually exclusive. On the contrary, almost all human institutions have economic aspects

and economic significance. Taken as a whole they constitute the institutional setting of economic life.

*INSTITUTIONAL SETTING OF ECONOMIC
LIFE*

To be realistic, economic analysis must concern itself, not with isolated individuals, but with people living in a world in which their behavior, choices, and modes of thought and action are actually molded and influenced by a heritage of customs, conventions, and institutions built up through the centuries. Some parts of this social, intellectual, and economic environment may seem poorly adapted to the conditions of the present day, yet their importance cannot for that reason be ignored. At the same time, there is a continuing struggle to adjust social institutions to current needs, or to develop new organizations, institutions, and modes of action, to meet these needs. This is at once apparent if one considers how the gradual development of the present forms of organization of industry and commerce has changed the conditions under which the individual lives, works, and spends his income. It has altered his outlook, his opportunities, and his whole behavior.

Business activity, for example, is now carried on chiefly by corporate organizations rather than by individual business proprietors, and much of the production of raw materials, heavy machinery, and other producers' goods, and of consumers' goods as well, is in the hands of large-scale enterprises. At the same time, a considerable part of the population has come to be

employed on a wage or salary basis, and incomes derived from different forms of economic activity vary tremendously in size among individuals.

The preservation of historical perspective in studying economic relationships is especially important, because many of the economic and business institutions now taken for granted, and often considered immutable, are in fact the product of less than three quarters of a century of growth. This is true, especially, of the business corporation. It is true also of certain rights of individuals and business organizations that, within the past fifty years, have been recognized by the courts as "property."¹

OBJECTIVES OF ECONOMIC ANALYSIS

Explanation of the Functioning of the Economic System. The economist undertakes the task of economic analysis with two important objectives in view. The first of these objectives is to obtain an understanding of the operation of economic forces, and a picture of the economic relationships that constitute collectively the framework within which economic life is carried on.² The primary function of economic analysis is to provide this understanding.

¹ For example, the right of access to a market, or the right "to do business."

² An *economic force* is a condition that tends to motivate economic action. Human desires are elemental economic forces, inasmuch as they constitute the fundamental urge for economic activity. In a complex economic structure, changes in population, in techniques, in tastes, and in choices are constantly occurring. These, with many other circumstances, including even the hopes and fears people have, give rise to an ebb and flow in economic life, to which people are constantly attempting to adapt themselves and their undertakings.

Some people seek this understanding because of scientific curiosity, or the desire to know, for the sake of knowledge, the causal order in the occurrence of economic events. Others seek knowledge for the help that it may render in planning business undertakings or in formulating the economic policies of states and nations. Still others are interested in the study of the economic system because they feel that its operation now falls short of fully satisfactory results. If the causes of its failure can be discovered, it may be possible to devise and apply remedies that will make possible a fuller measure of social well-being. If the force and direction of changes that are occurring can be ascertained and clearly understood, a basis for formulating plans of action for the future may also be attained.

Evaluation of the Operation of the System. The second major objective of economic analysis is to evaluate the operation of the economic system in terms of its capacity to promote economic welfare. The term "economic welfare" is narrower in its scope than the general social welfare. Anything that operates to increase the sum total of goods and services capable of satisfying desires contributes to economic welfare. Admittedly, from a broad social point of view, some desires should better go unsatisfied; admittedly, also, the true level of social well-being is not to be measured in purely material terms. It is, however, chiefly with the problems of material well-being that economic activities are concerned, and it is therefore to them that the attention of the economist is primarily directed.

Having gained some insight into the character of

economic processes, and the relationships through which they are carried on; the economist is then in position to consider the extent to which the actual functioning of the economic system succeeds in accomplishing the results that might be expected of it. It may be said that the broad purpose of economic investigation is to discover how to maximize economic welfare by attaining the most efficient use of the available means. From the *economic* standpoint the economic system is to be judged simply in terms of the efficiency with which it functions in this purpose.

Economic analysis *per se* does not deal with the propriety of human activities, or the goodness or badness of human desires. A judgment as to the *aims* of the social group lies outside its scope; it is concerned only with the efficiency with which the economic mechanism serves the existing aims. Nor does it assume that one type of economic organization, such as Capitalism or Socialism, is inherently better than another, or more "natural" than another. Nevertheless, it does afford some of the data on which to base judgments as to the ability or inability of the system to afford socially desirable results. It provides a necessary starting point from which to proceed in dealing intelligently with broader issues of social policy, in which economic considerations are important, but not the only, criteria.

Noneconomic Criteria of Social Welfare. An economic system that met in high degree the test of efficiency in its capacity to serve economic welfare might still be adjudged socially bad on other grounds. To say that other criteria, on the basis of which the

social advantage of the economic system may be judged, are not economic criteria does not mean that they are, for that reason, insignificant. Indeed, they may be far more significant for true social welfare than mere efficiency in meeting the desires of men.

In proceeding to the discussion of the merits and deficiencies of the economic system in broad terms of social welfare, however, the student passes from the bounds of economics into the realm of ethics and social philosophy. In such a consideration of the operation of the economic system there are many standards that might be, and indeed have been, applied in judging its capacity to serve true social welfare. Depending on his viewpoint, the critic may inquire as to the capacity of the system

(1) to produce only things that are useful, good, and beautiful, and nothing that is ugly, harmful, or shoddy;

(2) to supply a living wage to all the members of society, and thus to function without unemployment;

(3) to bring about progress in science and the arts, thereby increasing productive powers, yet to retain stability;

(4) to minister to (or be subservient to) individual freedom or liberty, and yet protect the weak from the strong.

It should be recognized that these criteria go far beyond, and indeed may be inconsistent with, the purely economic criterion of efficiency discussed above. Moreover, they are, to some extent, contradictory. If the gratification of human desires is taken as the primary purpose of economic activity, the economic

system cannot be judged on the basis of failure to produce only things that are good and beautiful so long as many desires are for things that are harmful or shoddy. Nor can it be judged on the basis of failure to maintain full employment at living wages, if desire to use new inventions to produce more cheaply causes some employment to become unprofitable. So long as the purpose of economic activity is to satisfy desire, conformity with any of the other four criteria listed above is the result of coincidence and not of purpose. It may be that other human organizations outside the existing economic system, such as the state or the Church, will have to be relied upon for attaining greater conformity with some of these noneconomic purposes.

There are thus two questions of evaluation, instead of one, to be answered: Does the economic system, as it stands, efficiently perform its function? Is its function or aim a right one? Neither of these questions will be explicitly answered in this book, but the tools of analysis described will help to answer the first and make possible a more secure foundation for approaching the second.

NATURE OF ECONOMIC PRINCIPLES

Limitations: Restricted Possibility of Experiment. In undertaking the formulation of economic generalizations or principles, the economist (together with most of the other social scientists) is handicapped in his methods as compared with students in the natural sciences. Unlike the latter, he is virtually unable to

resort to the controlled experiment as a means of verifying assumptions.

If, for example, the natural scientist wishes to measure the nervous reaction of a frog to an electric current, every other environmental factor, such as intensity of light, atmospheric pressure, temperature, and degree of humidity, can be kept constant, the only variable factor being the voltage of the current. The experimenter under such conditions can be reasonably certain that such changes in reaction as he observes are due solely to changes in the voltage of the current applied, and to no other factor.

The data for interpretation in the social sciences, however, consist of actual sequences of historical events. In the vast majority of cases, these are so interwoven with other events as to make it difficult, if not impossible, to draw an indisputable inference as to their causal order. It is also difficult to determine the relative importance of contributing forces.

Economic Generalizations as Statements of Probabilities. This does not mean that generalized inference is impossible in economic investigation, but simply that the generalizations must be made in terms of probabilities. The proper uses and the limitations of the tools employed must be recognized. The assumptions, on the basis of which analysis proceeds and generalizations are made, must be constantly subjected to the test of conformity to reality. The generalizations of economics must be looked upon as statements of what is likely to happen under certain specified conditions. These statements presumably will be rational

deductions or inferences from experience, but they should be regarded as subject constantly to verification by recourse to further experience.

In recent years the development of statistical methods, and the increasing accumulation of business and other records, have afforded better and better facilities for testing the accuracy of economic generalizations. Yet there is no prospect that the perfection of statistical methods or the accumulation of data will ever make it possible to approach the precision of measurement and prediction that has been attained by the physical sciences.

Recognition of the qualified nature of the generalizations in economic analysis makes it necessary to avoid statements of economic "laws" or "principles" in any form suggesting that they are absolute truths or universally applicable dogmas. A person becomes a trained economist, not simply by familiarizing himself with a series of laws or theorems, to be applied mechanically, but by accustoming himself to the discriminating analysis of particular conditions or situations.

CHAPTER II

Production and Income in the Modern Economy

DESIRES AND INCOME

SATISFACTION OF DESIRE AS AN INCENTIVE TO ECONOMIC ACTIVITY

A SIGNIFICANT point to be noted with respect to human desires and their satisfaction is that these desires are spread through time. As life goes on from day to day, some desires (chiefly those associated with basic bodily needs for food, clothing, shelter, or rest) recur at regular intervals. Other desires of extremely diverse character present themselves in a less regular pattern. The life of each person, considered in this way, consists of a chain of successive desires. If these desires are to be satisfied, it is necessary that the requisite goods or services be available at the proper time and place. In other words, the stream of desires, from day to day or from year to year, requires a corresponding series of uses of goods and services.

The activities necessary to make goods and services available must be undertaken and completed in advance of the satisfaction of the desires they are designed to serve. Consequently, the incentives to economic activities consist of *anticipated* future satisfactions that are more or less remote when the activity is undertaken. Sometimes the desired result may follow immediately after the initiation of a given course of action, as, for example, when a step would take one from a stuffy room to draw a breath of fresh air outdoors. In other instances, future desires must be foreseen far in advance, if they are to be met. Tickets for a big game, or a New York theatrical hit, may be sold out long before the performance; wheat must be planted in the fall or early spring for the next winter's bread; the plans of a new America's Cup defender must be drawn, and the models tested, months before the keel is laid down. Even the cigarette, that affords a moment's pleasure, would not exist, conveniently at hand, if the desire had not been anticipated.

Thus, economic activity is stimulated chiefly by *expected* satisfactions. People buy things for the sake of the satisfactions they expect to obtain from the use of those objects. They work, primarily, because of the satisfactions they expect to obtain as a consequence. For the most part, no doubt, people's anticipations of the satisfactions to be obtained from a given course of action rest upon experience in the past, but everyone has learned by personal experience that expected satisfactions and those actually attained do not always coincide. From the standpoint of economics, however, the satisfactions that are expected to result from the ful-

fulfillment of desires are of primary importance as incentives.

It should be noted, also, that the terms "desire" and "satisfaction", as used in economics, are given a very broad interpretation. The economist assumes that the realization of desire affords satisfaction, and that choices between alternative lines of conduct represent an effort to maximize the satisfactions expected to result. This does not mean, however, that desire is confined to the gratification of the physical senses, to the exclusion of other forms of satisfaction. The desire to satisfy one's feeling of duty or of obligation, to serve some cause in which one is interested, to conform to the dictates of religion or conscience, or to experience the fulfillment of pride in work or craftsmanship, may be equally compelling incentives. Everyone has experienced the feeling of personal gratification that comes with the accomplishment of a purpose to which he has set himself, quite apart from any feeling of pleasure in a physical sense. It is in this broader meaning that desire, pleasure, and satisfaction are considered in the present book. From the standpoint of economic analysis, the term "desire" signifies any human aim, the attainment of which requires economic activity. The attainment of the desired end is a source of satisfaction.

PSYCHIC INCOME AND REAL INCOME

The feeling that accompanies the satisfaction of desire is *psychic income*. In order to obtain these satisfactions, or psychic income, the individual must be able to command the uses of goods and services that

are capable of meeting his desires at the appropriate time and place. These uses of goods and services constitute the *real income* of the individual. Expected or anticipated psychic income is therefore the incentive to efforts on the part of people to obtain real income. On the success of their efforts to obtain real incomes depends the extent to which they can actually satisfy their continuously emerging desires.

The reason for distinguishing between real income and psychic income is that there is no way of comparing the satisfaction that the use of the same object, or the same service, might afford to different people. Such variations among people in the satisfactions obtainable from the possession of particular goods or services might arise, for example, from differences in tastes. One person cares nothing for opera, whereas another does; adjacent seats at the opera would afford quite unequal satisfactions to each of them. There is, therefore, no way of comparing the psychic income of different people, even though the effort of each individual to gain the maximum of psychic income constitutes the mainspring of economic life.

Real income, on the other hand, is capable of measurement and comparison from one person to another, because it is possible to enumerate the physical goods and services whose uses are at the command of different people. The real income of the individual can be estimated and summarized, whereas the magnitude of the dependent satisfactions cannot be. Thus, it is possible to say that one person has greater real income than another because he has a larger quantity

of goods and services at his disposal; although it is not possible to say that two persons having the same amount of real income obtain similar satisfactions from those incomes.

REAL INCOMES AND MONEY INCOMES

It may seem strange that so much emphasis is placed upon real incomes, in terms of uses of goods and services, when most people are accustomed to receive their incomes in the form of money payments. Money incomes are significant, however, only because money represents purchasing power, or the means with which to purchase goods and services. Differences in money incomes are important simply because people with different money incomes are able to purchase correspondingly different quantities of goods or services for use in meeting desires. Real incomes are, therefore, more fundamental than money incomes from the economic standpoint.

Moreover, changes in money incomes may not bring about corresponding changes in real incomes. Some of the serious economic problems of the world arise because of changes in the value of money, that is, as a consequence of changes in the purchasing power of money. Such changes are reflected in changes in the general price level, or, in other words, in the prices of goods and services in terms of money. In 1920, for example, the prices of commodities of all kinds were higher, in terms of money, than they were in 1923, and an income of \$5,000 would not buy as much as it would three years later. In the same way, an income

of \$5,000 in 1929, at the peak of prosperity, would purchase less in terms of commodities than it would three years later, in 1932, when the general level of prices was much lower. Changes in the general purchasing power of money make it necessary to consider what goods and services a given money income will buy, before one can judge whether a change in money incomes from one time to another will leave an individual better off, or worse off, than before. The answer to this question is found by estimating the amount of real income that could be purchased with his money income.

RELATIONSHIP OF EXCHANGE AND PRODUCTION

PRODUCTION FACILITATED BY EXCHANGE

Limited Productivity of the Isolated Individual. The possibility of increasing the sum total of goods and services available for the satisfaction of human wants, through recourse to productive activity, has already been emphasized. There remain to be considered, briefly, some of the circumstances that affect the efficiency with which the efforts of people and the resources of nature are converted into forms serviceable to human desires and wants. The isolated person, whether he be Robinson Crusoe on his island or the frontiersman in his cabin in the wilds, is restricted in his capacity to gratify his own desires by the char-

acter of his own immediate environment and by the limitations of his own physical and mental powers.

Co-operation and Specialization. With the growth of community life the opportunity of each individual to obtain the goods and services requisite for the satisfaction of his desires is greatly increased. This is a consequence of the possibilities for co-operation and specialization in production that group life affords.

The gains to be derived from co-operation are exemplified in communal undertakings of all kinds, where the strength or resources of a single person are insufficient for the ready performance of a difficult task. The barn-raising of pioneer days, the pooling of several farmers' slender funds for the purchase of an expensive machine to be used in common, or the establishment of a research organization by a number of firms in an industry, are all examples of the possibility of doing, in combination, what no one individual or firm could do alone.

The phrase, "specialization in production", describes a system under which each individual, instead of attempting to provide directly for his own desires, devotes his attention to the production of larger quantities of fewer kinds of goods. Instead of producing a small quantity of each of many different things, he produces a larger quantity of one thing, and exchanges a part of this larger stock for small quantities of the many other things he requires.

The advantages of specialization, or "division of labor", are manifold, as are also the forms in which specialization may occur. Indeed, it is virtually im-

possible to conceive of a situation in which some division of labor is not practiced. An important gain from specialization is the possibility of utilizing different people, and different groups of resources, in the types of production to which they are best adapted. People vary in tastes and capacities for kinds of employment. Their efforts will yield a larger total output if they are assigned to occupations agreeable to them and to which they are well fitted. This form of division of labor is sometimes called "occupational specialization."

Important advantages also flow from the further subdivision of the process of producing a particular commodity, and the assignment of these smaller tasks to different persons. The concentration of attention so achieved frequently permits the attainment of greater manual dexterity or skill. At the same time, it is possible to allot those operations requiring greater skill to more highly trained men, leaving the remainder of the work to less skilled, or to unskilled, laborers. As a consequence, an economy in the use of labor and an increase in the efficiency of production may be achieved. Furthermore, with the extensive subdivision of productive processes, the possibilities of developing and applying machinery to the performance of specific operations are more easily discovered and exploited.

Geographical specialization is essentially an extension of occupational specialization. This involves the concentration of the production of commodities in those regions to which they are best adapted. Important differences in climatic conditions, in the distribution

of natural resources, and in the peculiar aptitudes of the people give some localities a greater potential efficiency for producing certain commodities, while others are better fitted to the production of other goods. It is not difficult to see the advantages that accrue from the exchange of tropical fruits, coffee, rubber, and similar products of the torrid zone for the grain, mineral products, and manufactured goods more advantageously produced in temperate climates. Equally obvious are the gains that result from the division of economic activities between rural areas and the cities. In all such cases, geographical specialization offers possibilities of obtaining real incomes much larger than those attainable under conditions of self-sufficiency.

Roundabout Character of Production. In the simple self-sufficient economy, the individual as producer might proceed to apply the materials of his own natural environment to the satisfaction of his own wants. Even there, however, the first step toward a *roundabout* or indirect method of production would come with the construction of a crude weapon with which to hunt more efficiently. In a specialized economy, the tools and equipment are made by specialists, the raw materials are extracted by specialists, and the other steps in production are likely to be divided among many special manufacturing and marketing units. For example, consider the various kinds of manufacturing enterprises involved in the production and sale of such a simple commodity as a pencil. One producer is engaged in cutting the timber,

another in sawing and milling the wood. Still others are involved in the production of the metal head containing the eraser, others in the manufacture of the rubber eraser, to say nothing of those engaged in the production of the raw materials and their processing in order to produce the "lead."

IMPORTANCE OF EXCHANGE IN FACILITATING SPECIALIZATION

Specialization in production is intimately connected with, and dependent upon, the exchange of products. Without exchange, specialization is impossible. Moreover, as the difficulties that stand in the way of exchange are overcome, so that larger groups of people are brought within reach of one another, the possibilities of gain by specialization are correspondingly enhanced. A cheapening of the costs of transportation, for example, may make it advantageous to concentrate the production of wheat or corn in agricultural areas best adapted to the raising of these products, where previously the high costs of transportation had been more than sufficient to offset the advantages of concentrated production.

Broadening the area over which goods may be shipped, bringing more people within the reach of a particular producing area, promotes the efficiency of production in still another way. Mass-production industries utilize an enormous amount of highly specialized plant and equipment, together with large amounts of labor, in the production of a great volume of out-

put. If purchasers could not be found for this mass output, production on a large scale would be impossible, and the economies in production that it entails could not be obtained. Thus, large-scale production is dependent upon the existence of facilities for the exchange of products over large, densely populated areas. Anything that improves the efficiency of the facilities for the purchase and sale of goods, or contributes to the reduction of the costs of moving them, contributes also to the attainment of greater efficiency for the whole economic system in serving the desires of men.

ECONOMIC CONSEQUENCES OF GROWTH OF THE EXCHANGE ECONOMY

With the gradual extension of the system of production for exchange (a movement that has been traced in detail in the first volume of this series), the complexity of economic relationships has been multiplied. At the same time, the economic system has become more delicate, in some respects at least, and more subject to dislocation under the impact of sudden stresses. It will suffice at this point to indicate some of the causes that contribute to maladjustments in the economic system of the present day, leaving until later the detailed analysis of the relation of these causes to the operation of the system.

INDIRECT CONNECTION BETWEEN PRO-
DUCTION AND SATISFACTION OF
DESIRES

Altered Basis of Comparing Efforts and Satisfaction.

One of the most significant consequences of the development of the exchange economy is the severance of the direct connection between production and the satisfaction of desires that exists when an individual provides for his wants directly. If a person is dependent upon the results of his own unaided effort in the production of the desired goods or services, it is possible for him to compare directly the satisfactions to be gained and the efforts to be expended (or the other satisfactions to be sacrificed) in producing a certain quantity of goods. Effort will be expended so long as the satisfactions expected to result are, in the estimation of the individual, sufficient to warrant the expenditure. They will be discontinued when some other purpose, such as the enjoyment of leisure, is more appealing than the added satisfactions that would result from the possession of a more abundant stock of serviceable goods.

With the development of a system of production for exchange, however, the desires that must be served are for the most part not those of the individual producer, but of all the people who are prospective buyers. There is no longer any way of comparing the efforts expended in the production of goods with the satisfactions derived from their use, because these efforts and satisfactions are no longer united in the same person.

The impersonal machinery of exchange has intervened. Thereafter, the individual is no longer producer and consumer of the same things, but a producer of one thing and a consumer of many. The comparison made by the individual, therefore, is between the effort expended in producing goods and the satisfactions that can be obtained by spending the income derived from their sale. In the main, production for exchange tends to increase real income by extending the range of choice and the quantity of enjoyable goods and services that can be obtained.

Accentuated Emphasis on Money Income. The tendency just described is accompanied, in the exchange economy, by an increased emphasis on money incomes. In modern communities most exchanges do not involve the trading of goods for goods, but of goods for money. The money received in one transaction affords the seller a sum of purchasing power with which to buy other goods as they are required for the satisfaction of desires, or for other purposes. Although technically the use of money in exchange is simply a convenience that facilitates the process, it nevertheless contributes to the still further depersonalization of the relations between producer and consumer. It helps to conceal the real identity of consumers and producers, although taken as a group, the consumers and the producers are the same people. It therefore may contribute still further to the potential opposition of interests between particular producers and the community generally.

Potential Opposition of Private and Group Interest. In many cases, but not in all, the conditions surround-

ing the production and exchange of goods and services are such that the largest possible money income can be obtained by producing up to the limits of individual ability. Under such circumstances, the interests of the individual producers coincide, in the main, with those of the group as a whole; both producers and consumers benefit from the abundance of product. There are many situations, however, in which the desires of consumers for particular products are such (in comparison with their desires for other goods) that they will buy increased quantities only at sharply reduced prices. Under such circumstances, the larger sale of the particular product will yield to its producer a smaller money income than he could obtain from the production and sale of a smaller quantity. The reasons for this will be considered in greater detail in Chapter IV. For the moment, it is sufficient to recognize the fact that the individual producer may improve his own position, his own income, and his ability to satisfy his own desires, by restricting, rather than by expanding, his productive activities.

Where there are many producers of the same variety of goods or services, such a restrictive policy on the part of the individual would be defeated if all of the producers did not follow the same policy. Where the numbers of rival producers are small, it may be possible for them to agree to promote their group interest by pursuing restrictive practices in common. The various situations surrounding the production and marketing of goods will be outlined in the following chapter and analyzed in detail in Chapters V to VIII.

UNCERTAINTIES IN PRODUCTION FOR
EXCHANGE

Impersonal Market Demand. In an exchange economy each person or firm is engaged in producing goods for sale to others, rather than for his own use. Under such conditions, there is a greatly increased possibility of mistaken judgment, because the individual producer must proceed on the basis of his estimates of what other people will want. Of course mistakes in judgment could occur, even in a self-sufficient economy, so far as estimates of the needs of the future were concerned, but these possibilities are multiplied when the producer is trying to anticipate the desires of other people.

Time-Consuming Character of Production. The necessity of applying productive effort, or undertaking business activity, on the basis of estimates or forecasts is not solely due to the separation of producer and consumer. It is also a consequence of the fact that, with specialization, production as a whole generally becomes a more and more protracted process.

For a number of reasons, time is prerequisite to specialized production. Time is required for the construction of the durable plant and equipment used in modern production. It is required for the assembly of raw materials from widely scattered sources at points where specialized productive facilities and labor will convert them into finished products. The manufacturing process itself is frequently time consuming. Finally, it requires time to distribute the finished prod-

ucts through various channels to the ultimate users whose desires they were produced to satisfy.

Under such circumstances, the efforts and resources devoted to the production of particular products, with the passage of time, may prove to be either insufficient or excessive, in the light of the actual character and intensity of the consumers' desires. This source of maladjustment is inherent in any system that involves production in anticipation of human desires. Even where actual production of the finished good (as in custom tailoring) is postponed until specifically ordered by the prospective consumer, many preparatory processes must be carried on in expectation of the desire for clothing. Sheep must be raised and sheared, the wool washed, combed, spun into yarn, dyed, woven into cloth, finished, and delivered to the tailor, before the suit can be made. Beau Brummel would go naked for many a year, if he waited while his order for a suit inaugurated the long chain of productive processes that the finished garment represents. It is to be noted that, although the productive process extends over a longer period of time, it is nevertheless true that the quantity of output in a given period of time is greatly increased by specialization.

Intentions of Other Producers. In such a system of time-consuming, roundabout production, where various specialized activities are performed by producers competing with each other for markets, the plans of any particular producer are complicated by uncertainties concerning the intentions of other producers. The individual producer's scale of production must be planned

well in the future because such plans will determine the type and amount of machinery and equipment that he must purchase and install for manufacturing. If, however, the price of a particular commodity is higher than the cost of producing it, thus favoring an expansion in production, numerous competing manufacturers may all be induced, independently, to expand their plants and equipment at the same time. The unforeseen decline in price, which results from such a simultaneous expansion of outputs, will bring price and costs into a relationship sharply at variance with the expectations on which expansion was based. The result is that the individual finds his situation with respect to plant capacity, price, and costs materially different from that which he would have chosen, had the actions of other producers been foreseen.

CHAPTER III

The Mechanism of Exchange

IMPORTANCE OF THE CONDITIONS SURROUNDING EXCHANGE

EXCHANGE AS A MARKETING PROCESS

IN a society largely characterized by production for exchange, consumers cannot depend upon accidental or informal contacts with a myriad of producers to obtain the great variety of goods and services that minister to their desires. An elaborate organization is necessary to assure that, within reasonable limits, the goods and services needed for the satisfaction of desires will be available at the time and place required. The activities connected with this process of exchanging goods and services are termed, in a broad sense, "marketing activities", and organized facilities for the exchange of goods have been known as "markets" since medieval times.

NATURE OF THE MODERN MARKET

Contrast with Medieval Market. In earlier times it was comparatively easy to give a precise definition of a market. The term applied to a definite *place* where groups of buyers and sellers met at regularly specified times for the exchange of goods. The market was a characteristic feature of every medieval town of any consequence, and the weekly market day was the occasion for the general gathering of peasants and townsmen for the mutual exchange of their respective products. Those who took part in these periodic exchanges were drawn from an area of a few square miles about the market town. The difficulty of transportation and the lack of ready means of communication restricted the area of the market, and cut it off, for the most part, from the rest of the world. Under such circumstances, the relationships of the buyers and sellers were comparatively clear and distinct.

In modern economic society, however, the market can no longer be as easily defined or described. As a consequence of the increasing speed and comparative cheapness of modern transportation, and the growth of large-scale production, buyers and sellers are often separated by hundreds or thousands of miles, and goods find their way from producers to consumers through many channels. Seldom, if ever, do buyers and sellers meet as groups for the trading of the things in which they are interested. To be sure, organized markets, with definite physical facilities, are maintained for trading in securities, livestock, and certain staple com-

modities such as cotton, sugar, wool, or coffee. There are also some large auction markets, in or near big cities, for the sale of perishable foods, dairy products, and the like. Such organized markets, however, seldom exist for the sale of consumers' goods. Indeed, only a small fraction of all goods, whether sold to consumers or to producers, are traded on organized markets.

In modern usage the term "market" is usually applied, not to some definite place at which exchanges occur, but to the whole complex set of conditions surrounding the production and sale of some particular commodity. Thus, people speak of the market for wheat, or the market for electric refrigerators, or the market for iron and steel products, using the term "market" as a loose, convenient way of referring to the arena within which the conflicting forces of supply and demand are brought together and expressed in the price of a particular commodity.

Definition of the Modern Market. For the purposes of economic analysis, the term "market" applies to a system of mutual trading relationships that includes all those individuals or firms whose activities, either as rival buyers or rival sellers, directly affect the current price of a particular commodity.

The Market as a Geographical Area. A market, so defined, will include a larger or smaller geographical area, and a larger or smaller number of people, depending upon the price problem under consideration. One person might be interested in ascertaining the conditions of supply and demand affecting the price of milk, or fresh vegetables, or some other commodity,

in the New York metropolitan area. So far as he is concerned, then, the boundaries of the New York metropolitan area will constitute the geographical limits of the market in which he is interested. He will therefore devote himself to a study of the forces affecting the demand for the commodity in question, within that area, and the conditions affecting the quantity offered for sale there. Another person, however, might be interested in the conditions of demand and supply that tend to affect the prices of the same commodities throughout the eastern seaboard area. For him the market will embrace a much larger territory, and he will find it necessary to investigate circumstances that might have little influence upon the demand or supply within the New York metropolitan area. Thus, the definition of a market for a particular commodity must indicate the area within which are operating the forces that directly affect the price and volume of trading.

The Market Defined in Terms of Product. An equally essential part of the definition of a market is the identification of the specific product whose market is being considered. Reference may be made to the market conditions affecting the price of No. 2 red winter wheat, or to the market for wheat as a whole, or to the market for all cereal grains as a group. Similarly, reference may be made to the market for Ford cars, to the market for Plymouths or Chevrolets, or to the "low price car" market as a whole.

It is clear that in each of these cases the term "market" is applied rather loosely to a group of differ-

ent, although more or less closely related, products that may be considered either singly or as a group. In the strict sense of the term, it is proper to speak of a "market" only when referring to one of the sub-groups. There is no such thing as a demand for low-priced cars except as a composite of the demands for different specific makes of low-priced cars. There is actually a series of overlapping markets for low-, medium-, and high-priced cars. Within each of these markets there is a demand for a specific make, and a supply offered by a particular manufacturer. But within the low price field the possibility of shifting from the purchase of one make to the purchase of another car in the same class, or in a higher price class, is so great that the demand, price, and volume of sales in each market are very closely related to the conditions in another. It is necessary, therefore, in many instances to study the conditions prevailing in a number of closely associated markets in order to understand what is happening in any one of them taken by itself.

THE PRICE STRUCTURE

The study of the production, prices, and exchange of goods involves not only a knowledge of markets, but an understanding of *price structures*. Especially in such industrialized countries as the United States, goods are often produced in a few large plants, or in a few producing areas, and sold to consumers at thousands of different points throughout the country. Shipments to more distant points involve greater costs for transportation, which result in inequalities of prices

in different localities. Such price inequalities are known as *local price differentials*. If prices are higher in one city than in another by more than the cost of transporting goods between them, a gain may be obtained by shipping goods to the city in which prices are higher.

Differences may exist even within a single locality between the prices charged by one merchant and those charged by another. These inequalities in prices can arise, and continue to exist indefinitely, because of differences in service or in the prestige of the various sellers, or because customers are disinclined to give up habitual or customary trading relationships. If prices diverge too far, however, shifts in patronage will begin to occur, despite inertia. The existing local market structure will tend to be upset and new relationships to be established.

The prices of similar articles (such as different makes of radios) are related to each other in a structure of prices. Differences in the prices of various makes tend to reflect differences in quality, size, style, and the like. The use of the term "structure" in this connection does not mean that prices and the trading relationships among the different varieties are rigid or remain unchanged as time passes. They are, on the contrary, constantly subject to change as the seller of each commodity endeavors to ascertain the price and volume of sales that will be most advantageous to him.

Finally, certain relationships normally prevail between the prices at which consumers' goods are sold at retail, and those prevailing at wholesale, or in the sale by manufacturers to jobbers. These prices, at different

stages in the marketing process, are related to each other vertically. Indeed, it is through this vertical structure of markets and prices that the demands of consumers and the activities of producers are related to each other.

MAJOR TYPES OF MARKETING SITUATIONS

Goods and services are bought and sold, in the modern world, under widely divergent marketing conditions. Inasmuch as these conditions exercise profound influence on the price and quantities of goods exchanged, it is desirable to begin with a description of the principal types of marketing situations that are encountered today. In the present chapter there will be no attempt to trace the operation of the forces by which supply, demand, and price are brought into equilibrium under any of the different situations described. The purpose is simply to set forth the objective features that distinguish the major types of contemporary market situations.¹ The various situa-

¹ For the moment it is sufficient to note that the term "demand" is used to symbolize the choices of consumers, as represented by their willingness to spend their incomes in buying different kinds of goods. It is assumed that without any change at all in the preferences of consumers, they would buy more of a given kind of goods if the price were low than if it were high, all other circumstances except this one remaining unchanged. The term "demand" sums up this characteristic responsiveness of the consumers to the level of price. In the same way the term "supply" expresses the responsiveness of the quantity offered for sale to possible variations in price, all other conditions remaining unchanged. The detailed consideration of the forces influencing supply constitutes a major part of economic analysis and is treated in Chapters V-VIII.

tions arise chiefly as a result, first of differences in the relative numbers of buyers and sellers and, second, of differences in the availability of substitute commodities. Each of these factors will be examined briefly, and then the various types of market situations will be outlined.

DIVERGENT CONDITIONS SURROUNDING EXCHANGE

The Number of Buyers and Sellers. One of the most important conditions affecting the marketing situation for a particular commodity is the number of rival traders, either on the buying side or on the selling side of the market. It is obvious that, in this respect, the widest diversity of conditions is possible. In the sale of one commodity, such as a certain make of automobile, there is likely to be in any market (and certainly for the country as a whole) only a single seller and a large number of buyers. On the other hand, it is conceivable that, for some products, there might be only a single buyer facing a large number of sellers, though such a situation seldom exists, so far as consumers' goods are concerned.

Another market situation, commonly found in the sale of agricultural products, exists when there are many rival sellers and many rival buyers of a given kind of good. On the other hand, a single buyer may trade with a single seller in isolated exchange (as in the private sale of a used car), or in continuing business relations with each other (as when one man rents a house from another).

An additional group of market situations arises where

either buyers or sellers, or both, are few in number. Such situations have in recent times become typical in many industries, and an increasing amount of attention, accordingly, has been devoted to the study of the forces affecting prices and exchange where numbers are few. The question arises, of course, as to the conditions under which sellers or buyers are to be described as "many" or "few." The answer to this question depends, in considerable measure, on the commodity and the market to which reference is made. In fact, no specified number, such as one hundred buyers or sellers, marks the dividing line between "many" and "few." Instead, the answer depends upon the degree to which the individual buyer or seller in the group realizes, and takes account of, the influence that his actions may have upon the price.

Thus, numbers are large when the action of any individual trader would not have a sufficient influence on the price for him to take account of that influence in making his plans. Numbers are small when changes in the sales of an individual firm would affect the price so much that, in determining his output, he will take account of his influence on price. The significance of this point will be elaborated in subsequent chapters.

The Presence or Absence of Ready Substitutes. The second important factor affecting the marketing situation for any particular commodity is the availability, or lack of availability, of other commodities that may be readily substituted for it by the consumers. The importance of this point has already been suggested by

the reference to low-priced automobiles in the preceding discussion of the definition of a product and of a market. Most prospective purchasers of cars have individual preferences among the rival makes of automobiles in a given price class, even though it is always possible to obtain much the same sort of service and satisfaction from another make. If the prospective purchaser finds the price of his favorite car greatly in excess of that of his second choice, he may take the latter as a substitute for the favorite. People, of course, differ greatly in their willingness to substitute. One person would switch from one make to another on the basis of a few dollars' larger allowance on his old car. Another would not take a different make under any circumstances.

Substitution may be impeded not only when products are physically differentiated, but even when they are identical, if there are differences in the circumstances surrounding the offers of rival sellers. For example, a housewife might buy potatoes, eggs, or packaged cereal from a dozen different merchants in town, yet prefer to buy from one, either because she had greater confidence in his honesty, or was better satisfied with the service he rendered. Likewise, the consumer might prefer to buy a radio or an electric refrigerator from one dealer rather than from another handling the same makes because the first had a better reputation than the other for prompt and reliable service.

One of the important developments of modern times has been the marked increase in the use of patented designs, trade-marks, and all the arts of advertising

to differentiate commodities of the same class. An effort is made to fasten the mind of the consumer, not on toothpaste as such, but on a particular brand, and to win his loyalty as an habitual buyer.

This differentiation of products obviously affects the marketing and exchange process very significantly. It tends to divide the market for a single class of goods into a series of separate, though closely related, markets bound together in a market structure. Furthermore it reduces, in a corresponding degree, the number of rival sellers facing the consumers in any single market.

Many different types of market situations may thus result from differences in the numbers of buyers and sellers, and from the presence or absence of product differentiation. For the sake of simplicity a few types that are most frequently encountered, or that most significantly illustrate the operation of the forces affecting price, are selected for discussion in the following sections. These types are, in the order of discussion, *pure competition*, *monopoly*, *oligopoly*, and *monopolistic competition*.

PURE COMPETITION

Characteristic Features. A market may be described as purely competitive if it includes large numbers of buyers and sellers, engaged in trading in a homogeneous commodity, with full freedom of action on the part of each trader. Stated in somewhat fuller detail, the three principal conditions for the existence of pure competition are these: First, the product offered for sale must

be perfectly homogeneous, so that one unit can be freely and indifferently substituted for any other. In the second place, the numbers of both buyers and sellers of the commodity must be large.² This means that no one of them alone can exercise an appreciable influence on the prevailing price, no matter how large or how small his individual purchase or sale, and that no one of them will be influenced by a consideration of the effect that his action might have on his fellow traders.

Finally, both buyers and sellers must be free to decide, as individuals, whether to buy or to sell, and at what price, without collusion with other traders, and without discrimination or intimidation of any kind. This means that there will be no limitation, other than voluntary choice, upon the entrance of additional traders into the market, or upon the withdrawal of those already present. Presumably the price offered will be the only criterion affecting the individual buyer's choice of a seller, and vice versa. Each buyer will seek the most favorable terms possible and will shift from one seller to another if he can gain by so doing. Assuming that the various traders have full knowledge of market conditions, significant differences in the prices charged by different sellers, or offered by different buyers, could not long persist. Such differences would be eliminated quickly by the shifting of purchases or sales.

²The competitive market differs in this respect from the auction, in which there are competing buyers but only a single seller. It differs also in that the buyers in a competitive market know that other opportunities to buy may be expected to come.

The competitive market has ordinarily been regarded as the ideal mechanism for the determination of prices, although there are comparatively few commodities sold under conditions that, in all respects, approach those considered essential for the satisfactory functioning of such a market. Agricultural commodities furnish the most conspicuous examples of production under such conditions, and the trading in the great commodity exchanges, as already suggested, affords the best example of organized competitive markets.

MONOPOLY

"Monopoly", in the original meaning of the word, implies that there is only one seller of a particular kind of good in the market. Historically, the term was applied to the grant made by a sovereign to an individual, giving him the exclusive right to sell some particular commodity under a "patent of monopoly." Later, the term came to be applied more generally to any seller who for any reason enjoyed an exclusive position in the sale of a commodity.

For purposes of economic analysis, however, a more precise definition of monopoly is desirable, because with product differentiation most consumers' goods are produced and sold by single firms. To define monopoly merely in terms of the number of sellers does not go to the heart of the problem of monopoly power.

Meaning of Monopoly in the Economic Sense. A pure monopoly, in the economic sense, exists when

there is a single seller of a commodity, and when, at the same time, that seller may fix his price to suit himself, without having to consider the effect that his policy might eventually have upon the demand for his own product. Such a situation would exist if there were no close substitutes for the monopolized product, and no possibility of other firms undertaking the production of such a substitute. The significance of this point will be made more fully apparent in the next chapter by the discussion of the forces affecting demand, and by the analysis in subsequent chapters of the considerations guiding business enterprises in the selection of prices.

Rarity of Pure Monopoly. There are few instances in which a change in the price of one commodity does not react upon the prices of other, substitutable commodities, and therefore upon the amount of substitution taking place. In other words, there are comparatively few instances in which even the single seller of a certain branded or patented product can set his price solely on the basis of the estimated demand for it. In most instances it is necessary also to take account of the probable reaction of the sellers of other products that might, under some price conditions, be used as substitutes for the monopolist's product. While conditions of pure monopoly rarely exist in the actual business world, monopolistic elements are very frequently encountered, mingled with conditions somewhat resembling those of pure competition. These situations are described by the term *monopolistic competition*.

MONOPOLISTIC COMPETITION

Characteristic Features. A situation of monopolistic competition exists when there are many producers of a certain type of product, and when, at the same time, the substitution of the product of one firm for that of another is limited by product differentiation. There are, thus, two characteristic features of monopolistic competition: (1) the existence of comparatively large numbers, and (2) product differentiation.

Monopolistic competition resembles pure competition, on the one hand, because, taking the entire range of more or less similar products, the number of sellers is large. It resembles that of monopoly, on the other hand, in that there is only one seller of a particular brand, though there may be many sellers of somewhat similar brands. Each seller is primarily concerned with the demand for his own particular brand, and his ability to sell it depends upon the number of people who can be persuaded to buy it instead of some other brand.

It is therefore appropriate to think of monopolistic competition as a situation involving several very closely related markets. In each market there is one seller (of a particular brand of goods) and a group of buyers, some or all of whom are prepared to shift their purchases to the market for the product of a rival producer if, by so doing, they can get an advantage in buying. Under conditions of monopolistic competition, each one of a group of sellers enjoys a monopoly of his own brand that is restricted by the ever-present threat of substitution of other brands.

OLIGOPOLY

The term "oligopoly" is applied to the case in which the rival sellers are few in number, whether their products are differentiated or not. In such a situation the interrelationships of supply, demand, and price become very complex. The most important feature of the situation where sellers are few in number is that, under such conditions, it is necessary for each one to take into account the effect that his own actions may have on the behavior of his rivals, and to act accordingly. In the United States, for example, there are only three important manufactures of low-priced automobiles. If one of them were to reduce the price of his car by fifty dollars, he would be likely to attract many customers from the other manufacturers. But if they, in their turn, were to reduce their prices correspondingly, the advantage gained by the manufacturer first making the cut would be in substantial measure nullified. Recognizing the probability of such a response by his rivals, the single seller is likely to feel that little, if any, ultimate advantage would be gained by altering his prices. Where sellers are few in number, they are bound to consider the effects of their actions upon their rivals, and the repercussions of these actions upon themselves.

What has been said above applies especially to oligopoly accompanied by product differentiation as exemplified in the production and sale of different brands of cigarettes. Substantially similar considerations, however, apply where a few firms are produc-

ing standard goods of the same physical qualities, such as steel shapes, cement, or anthracite coal.

It should also be noted that even though the production and sale of a commodity in the country as a whole are in the hands of many concerns, the number of effective rivals in any particular geographic area may be quite small. This is especially true of commodities for which the costs of transportation are large in proportion to the value of the product, as, for example, in the production and sale of cement.

The distribution of many consumers' goods, moreover, is likely to reflect quite clearly these characteristic features of oligopoly. In a community there may be several drug stores handling identical goods, but each store is likely to be the most convenient place for some of the residents in the community to trade, simply because it is the nearest. The stores further and further away become less and less desirable, from the standpoint of the consumer, simply because they are more distant. If there were five such stores, situated at intervals of a half mile along the street, each store would be in most vigorous rivalry with the stores nearest it on either side, and less so with the ones further away. Thus even though all of the stores were run equally effectively, each one would have some customers firmly attached to it, and others less and less so, as they were situated nearer a rival store. In such a situation, which has been aptly described as a *chain oligopoly*, it is obvious that the number of sellers in effective rivalry with one another is less than the total number in the community.

POSSIBLE VARIATIONS ON THE
BUYERS' SIDE

Thus far; the description of market situations has been based upon the conditions prevailing on the sellers' side of the market, with a more or less implicit assumption that there were, in each instance, many rival buyers. In general, this is true of the marketing of consumers' goods, but there are instances, especially in connection with the exchange of facilities, services, or materials used for production, where the reverse situation prevails. A *monopsony* (the counterpart of monopoly) would exist if there were many sellers and but a single buyer of a certain commodity. An employer of a certain class of specialized labor (as, for example, telephone technicians), might enjoy a position of monopsony with respect to that labor. Similarly, if the buyers are few in number, the situation is one of *oligopsony*; for example, cigarette manufacturers, being few in number, constitute an oligopsony in the buying of tobacco.

No attempt will be made to list all the terms that might be used to describe the various combinations of conditions on the buyers' and sellers' sides taken together. It is sufficient to note that the possible marketing situations range from that in which a single seller meets a single buyer to the one in which many buyers meet many sellers. The principles outlined in the subsequent chapters can be applied to the analysis of any one of the many combinations.

CHAPTER IV

Consumer Demand

DEFINITION OF DEMAND

THE desires of people have little economic significance until they become expressed in terms of demand for goods or services; that is, in terms of the willingness of people to exchange money (or other desirable goods or services at their disposal) for the goods or services offered to them by others. The demand of an individual for a commodity is indicated by the various quantities of the commodity that he would buy if it were offered to him at different prices, assuming that other conditions remained unchanged.

The market demand for a commodity or service at any time represents the various quantities that would be taken by *all* the individual buyers at different prices, assuming that other conditions remained unchanged. The term "demand" is customarily employed by economists to describe the entire demand situation at any given time. It is commonly assumed that if, in any short period of time, the price were higher than

it actually is, a smaller quantity of the commodity or service in question would be bought, and that if the price were lower, a larger quantity would be purchased. In the ensuing sections of this chapter the reasoning underlying this assumption will be examined in greater detail.

METHODS OF REPRESENTING CONSUMER DEMAND

THE MARKET DEMAND SCHEDULE

The way in which the demands of individual consumers combine to constitute the market demand for a commodity or service may be visualized readily in terms of a market demand schedule. Such a schedule represents the quantities that each individual would be prepared to buy, at various prices, and also shows the total amounts that would be taken at each of these prices. In the following table it is assumed that fresh eggs are being demanded by four buyers, A, B, C, and D. The amounts that each would be willing to purchase,

THE MARKET DEMAND SCHEDULE

PRICE (Cents per Dozen)	NUMBER OF DOZENS OF EGGS THAT WOULD BE PURCHASED				
	A	B	C	D	TOTAL
80	1	0	0	0	1
60	2	1	0	0	3
40	4	2	1	0	7
20	7	4	2	1	14

at the different prices indicated, are shown separately, and are then combined in a total figure in the final column.

It will be noted that of the various buyers, A is the most urgent, in that he would buy some eggs at a price higher than any of the others would pay. If the quantity available were small, he would be prepared to outbid his rival buyers in order to secure a sufficient quantity of eggs to meet his most urgent desires for them. At a lower price he would buy a larger quantity, and B would also purchase a small number. At still lower prices, C and D would appear as buyers, and A and B would buy still larger amounts. The total quantities that would be purchased at each price are represented in the final column. The total purchases would be greater at a low, as compared with a high, price, not only because more people would be willing to buy at a low than at a high price, but also because certain people, who would buy some at a high price, would buy more if the price were low. These totals constitute the market demand for eggs.

GRAPHIC ILLUSTRATION OF DEMAND

The Demand Curve. The market demand situation can most readily be visualized by representing graphically the relations of price and quantity demanded. This involves the construction of a diagram in which the total quantities that would be purchased are plotted opposite the corresponding prices. In Figure 1, on page 54, the base line represents the quantities of eggs that would be purchased, and the vertical scale represents the

corresponding prices at which those quantities would be purchased. For example, a dot is inserted opposite a price of 80 cents and directly above the 1 point on the base line, representing the fact that one dozen eggs

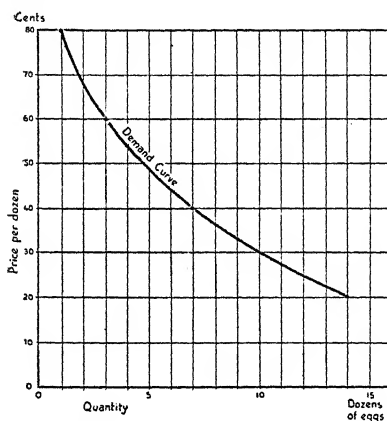


FIGURE 1. THE DEMAND CURVE

would be taken at a price of 80 cents. Another dot is plotted opposite the price of 60 cents and above the quantity 3, a third opposite a price of 40 cents and a quantity of 7, and so on. These points indicate that at a price of 40 cents, for example, the buyers would take seven

dozen eggs; at a still lower price of 20 cents they would take a larger quantity, fourteen dozen eggs.

If the points representing the various quantities that would be purchased at different prices are plotted, and connected by a smooth line, the *demand curve* is obtained for the commodity in question. Because of the convenience of this graphic representation of the conditions of demand at a given time, economists frequently speak of the demand curve for eggs, shoes, Cream of Wheat, or any other commodity or service sold to consumers. It is a convenient way of summarizing the demand situation for the commodity or service in question, and this usage will be fol-

lowed in the present chapter and throughout this book.

Negative Slope of the Demand Curve. It will be noted that in this illustration the demand curve slopes downward from left to right, indicating the fact that if the price were high, a comparatively small amount would be purchased, whereas if the price were low, a larger quantity would be bought. Such a curve is said to have a *negative* slope, because it indicates an inverse relation between the price and the quantity that would be purchased. This negative or inverse relation between quantity demanded and price is an outstanding characteristic of the demand for goods and services of all kinds at any given time. The following sections will review the conditions that account for this predominant inverse relation between quantity demanded and price.

CONDITIONS AFFECTING DEMAND

REASONS FOR THE NEGATIVE SLOPE OF THE DEMAND CURVE

The three principal reasons for the downward slope of the demand curve are (1) differences in income, (2) differences in taste, and (3) the diminishing importance of the desires that remain unsatisfied as the quantity of a given commodity in one's possession is increased. All of these causes are, of course, aspects of consumers' choices.

Differences in Income. Differences in the purchasing power or monetary incomes of consumers are sig-

nificant in accounting for the negative slope of the demand curve for any type of consumers' good. The clerk receiving a weekly salary of thirty dollars, with which to support a family of four in a crowded city, would doubtless prefer to live in a larger apartment or in a private dwelling, to spend his week ends in the mountains or at the seashore, to drive a better automobile, to buy better clothing for his family, and to enjoy other comforts and conveniences of life. With his restricted income, however, he is compelled to choose which of these many conflicting desires are to be gratified, in view of the prevailing prices of the various goods and services that he might buy.

If his income were larger, he would increase his purchases of some kinds of goods, and also extend his expenditures to include some things that previously were beyond his reach. Or, if the price of commodities were reduced, in comparison with his money income, he would also extend his purchases of other kinds of goods.

Since the number of people having large or moderate incomes is small, in comparison with the number receiving small incomes, the demand curve for any particular consumers' good tends to have a downward slope simply because, if the price were low, the good would come within the reach of a larger number of people, and vice versa.

Differences in Tastes. Even if people's incomes were approximately equal, differences in tastes would lead to variations in their eagerness to buy particular commodities or services. A football enthusiast, for ex-

ample, might be prepared to pay ten dollars for a ticket to an outstanding game. His less enthusiastic friend, however, would be inclined to go only if he were able to get an equally good seat for two dollars. At the lower price, therefore, two tickets would be purchased instead of one, since it may be presumed that the more ardent fan also would buy at the lower price.

Similarly, differences in tastes for any other commodity or service would result in a negatively sloping demand curve, because the lower price would induce less eager consumers to buy them.

The Influence of Diminishing Satisfaction. Even if all people had similar tastes and incomes, there would still be variations in the quantities of a commodity that would be purchased by consumers if its price were higher or lower. If the price were high, the consumer would purchase only a sufficient quantity to satisfy the most urgent desires to which that good could be applied. If the price were lower, however, he would tend to purchase a larger quantity in order to meet less urgent desires.

On a hot day in the summer, for example, a man might be able to think of a dozen different uses for an electric fan. A single fan in his office would promote his comfort, while two or three would further increase the refreshing circulation of air. At home, additional fans could be used in the kitchen, living room, and bedrooms, increasing the comfort of all the members of his family. Under such circumstances a person might be willing (if necessary) to pay a high price for a

single fan, the amount reflecting the intensity of the desires that could be satisfied by the possession of one fan.

During a summer heat wave the uses for the fan both at home and at the office might be sufficiently urgent to induce the man to carry the fan to the office in the morning and back home at night. A second fan, however, would make possible the satisfaction of both desires more conveniently, and he might therefore be willing to buy two fans if they could be obtained at a somewhat lower price. At still lower prices he might be willing to purchase three, four, five, or more, fans, depending on the urgency of the desires that could be satisfied by means of additional fans, in comparison with the desires for other things that would have to be given up if he spent his money for fans instead of using it to buy some of these other things.

The demand of an individual for a particular commodity depends, fundamentally, upon three things: first, the nature and intensity of his desires that could be satisfied by the possession of that commodity; second, the comparative intensity of the desires that could be satisfied, instead, by the possession of other commodities or services; and finally, the amount of income or purchasing power available for the satisfaction of all of his desires.

Considering each commodity singly, its possible uses can be ranged in a descending order of urgency, from those that are of vital importance to those that are of negligible significance. If the price of a commodity

were very high, a person would perhaps buy one or two units in order to take care of his most urgent requirements. He would quickly reach the point, however, where the purchase of an additional unit, at the high price, would prevent the purchase of certain other goods that would satisfy desires more urgent than the desire that could be satisfied by the possession of that added unit. If, however, the price of the commodity were lower, he would purchase a larger quantity. At the lower price, the additional satisfaction that could be obtained by purchasing additional units would exceed the alternative satisfactions that could be obtained if other goods were bought instead.¹

A moment's reflection will suggest that there are many possible variations in an individual's demand for a particular commodity, depending upon whether the prices of other goods are high or low. For the sake of clarity in analysis, economists are accustomed to assume, in discussing the demand for a particular commodity, that the prices of all other consumers' goods remain constant. This is what is meant by the phrase "other things being equal" or "general conditions remaining the same." Under such circumstances the quantity of the particular commodity that the individual would purchase, if the price were high or if it

¹ Note that this does not mean that an individual would always increase his expenditures for a given commodity if the price were lower. It simply means that at a low price he would tend to take a larger quantity, and that he does so because, at that price, the outlay for the added quantity will afford larger satisfactions than could be obtained by buying other goods and services. At a lower price the total amount spent might be less than if the price were higher, but it is still larger in total amount than if the person did not increase his purchases at all.

were low, would depend entirely upon the relative urgency of the desires that could be satisfied by buying different quantities of that good, as compared with the desires that could be satisfied by expending equal sums in other ways.

This idea is frequently expressed by saying that money, in the hands of the consumers, represents a "common denominator" that allows the consumer to compare the various satisfactions that he can obtain from numerous alternative goods or services. Thus, money is generalized purchasing power with which to obtain satisfactions. The consumer, in deciding whether or not to buy a certain thing, or in deciding how much of it to buy, may not stop to think of all the other things he could buy and the satisfactions they might convey. Instead, he may attribute a general value to the money and compare this with the satisfactions obtainable by expending that sum for the commodity in question.

FACTORS MODIFYING CONSUMER DEMAND

If the consumer were acting in a perfectly rational way, with full knowledge, he would not spend his income for additional purchases of one kind of commodity if its expenditure in some other way would make possible the satisfaction of more urgent desires. There are, of course, many circumstances that prevent any such highly rationalized allocation of incomes to expenditures of different kinds. Some of these circumstances will be reviewed briefly in the next section.

Nevertheless, people do make rough comparisons and estimates, at least with respect to more important transactions, however misguided these estimates and comparisons may, in the long run, turn out to be. Without some rationality, orderly economic life would be impossible.

Habitual or Conventional Choice. Many choices are matters of habit, routine, or conformity to group standards that are so deeply embedded in behavior as seldom to be called into the foreground of consciousness. Indeed, it is fortunate that many of the choices involved in daily life can be reduced to a matter of routine, because time and energy are thereby left free for more absorbing matters. Even when choices are consciously made between alternative desires, they are not necessarily accompanied by a careful balancing of the advantages and disadvantages of a given line of action. Nor do people invariably choose what they know is "best" for them.

In the course of time, every individual develops a more or less elaborate structure of habitual or conventional choices. Few persons who turn an electric switch, buy a newspaper, or purchase favorite brands of cigarettes, toothpaste, or cosmetics, engage each time in an active comparison of the magnitude of this desire with the importance of other desires that could be satisfied instead, were they immediately present to the mind.

It is significant that one of the gigantic businesses of the present age — advertising — and many other developments in modern business organization and mer-

chandising are primarily designed to increase the range of commodities to which consumer reactions are habitual. The producers of many varieties of consumers' goods engage in large-scale advertising, publicity, and other sales activities, each one endeavoring to attract a clientele of his own, composed of persons so attached to the particular brand of merchandise as to choose it habitually. Such a development tends to reduce rather than to extend the range within which the individual exercises a continuing, discriminating choice.

A great deal of habitual choice would, of course, exist under any circumstances, because it releases time and energy to be devoted to other perhaps more interesting and remunerative activities that would not be possible if every individual were compelled to devote the necessary time to the formulation of discriminating choices.

Some choices are consciously or unconsciously molded by the attitudes of the social group in which one lives. Thus, conformity to the conventional standards may shift actual choice in the opposite direction from private inclinations. Indeed, conformity to the standards of housing, dress, entertainment, and style, necessary to improve or preserve the esteem of neighbors, business associates, or customers, may rigidly limit the extent to which individuals are "free" to choose for themselves.²

²Thorstein Veblen and others have stressed the group aspects of choice as reflected in the urge to "conspicuous consumption" and "competitive ostentation"—consumption habits designed to demonstrate and maintain one's position in a chosen social group. The Lynds in *Middletown* have ably pictured the social forces affecting individual economic conduct in the typical American community.

Reliance on Judgment of Others. In the modern exchange economy, people frequently rely upon others to guide their choices, or even to choose for them, because they are not themselves in a position to make an informed, discriminating judgment. The mass of consumers have very scant knowledge to serve as a basis for judging the qualities of many of the things they buy and very little inclination to take the time to learn the essential basis for such discrimination.

Consumers, therefore, often depend upon the retail dealer to advise them, trusting to his good reputation to insure the quality of the goods bought in his store. They likewise rely upon the manufacturer of a well-known branded product to employ competent workmen and to protect the consumer against flaws or imperfections in the goods bearing his trade-mark. Like habitual and conventional choice, reliance upon others enables the particular individual to devote more of his time to other interests. For example, he may spend more time becoming proficient in the specialized occupation upon which his income depends rather than learning how to discriminate between good cloth and poor cloth that is used in the clothing he wears.

Satisfaction of Desires as a Dynamic Objective. The term "psychic income", broadly interpreted, serves as a convenient symbol for all the satisfactions that a person may obtain as a result of his actions or choices. Obtaining psychic income, however, is not a static but a dynamic objective. Life moves from day to day with a continuously changing stream of desires competing with each other for satisfaction. Some of these de-

sires represent fundamental bodily needs, and are regularly recurrent. Others present themselves irregularly in an ever-changing pattern.

If the desires of the future are to be satisfied when they actually emerge, provision must be made in advance to assure that the requisite goods and services will be forthcoming at the appropriate time. This means that all existing goods and services cannot be applied to the satisfaction of present desires. Some must be reserved for the future, or employed in the production of other things for future use. Therefore, in making present choices, people must consider not only present desires, but they must also estimate the nature and intensity of future desires. Strictly rational conduct in present choice would require that desires, whether present or future, be provided for in the order of their present urgency. The disparity in the time-location of different desires, however, results in present uncertainties and misjudgments concerning their relative importance. It follows that there is little assurance of achieving uniformity in the satisfaction of desires differently located along the time-path of a person's life. Choices made in the past in response to contemporary desires can seldom be altered, however urgent may be the subsequent wish to escape the consequences of those choices.

CHANGES IN DEMAND

The preceding analysis of the conditions affecting demand for a given commodity at a particular time

was based on the assumption that all other conditions remain constant. The discussion has indicated the basis for assuming that, at a higher price, less of the good would be purchased than at a lower price. The fact that a larger quantity would be purchased at a given time if the price were lower does not constitute a *change* in demand.

The remainder of the chapter will be devoted to a discussion of changes in demand. A change in demand occurs when, as a consequence of changes in tastes, incomes, or for other reasons, people will buy more (or less) of a particular commodity at any specified price than they would at an earlier time or under different conditions. If, at every possible price, the consumers would now be willing to purchase a larger quantity than they would have purchased earlier at the corresponding price, demand is increased. If at every possible price they would buy less than they would have taken earlier at the corresponding price, demand is decreased.

SHIFTS IN DEMAND

Changes in demand are frequently referred to as *positive* or *negative shifts*. This is because an increase in demand will be represented graphically by shifting the position of the demand curve to the right, or positively; a decrease in demand will be represented by shifting the position of the demand curve to the left, or negatively.

Graphic Illustration. Figure 2 on page 66 illustrates a positive shift in demand. The demand situation prior to the shift is indicated by curve *D*; the demand situation

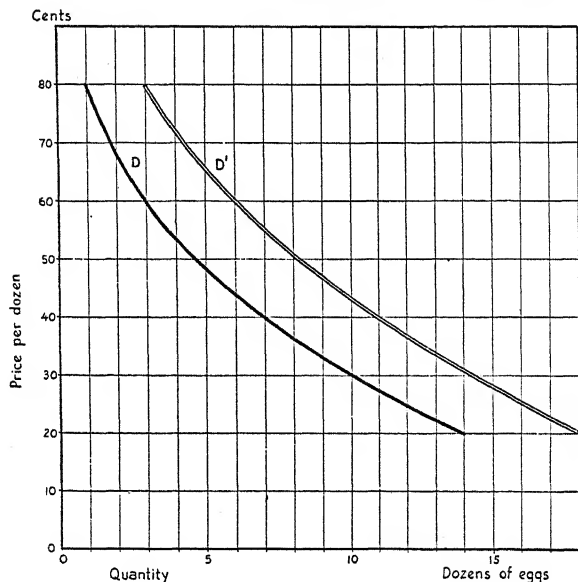


FIGURE 2. SHIFTS IN THE DEMAND CURVE

following the shift is represented by curve D' . The accompanying table gives the two demand schedules from which the demand curves were drawn.

SHIFT IN DEMAND FOR EGGS

PRICE (Cents per Dozen)	NUMBER OF DOZENS OF EGGS THAT WOULD BE PURCHASED	
	Before the Shift	After the Shift
80	1	3
60	3	6
40	7	11
20	14	18

Such a shift in the position of the demand curve is called a *positive* shift because, after the change, a larger quantity will be purchased at any given price than would have been purchased at the corresponding price before the change. For example, after the change in demand, three dozen eggs would be taken at 80 cents per dozen, whereas before, only one dozen would have been taken at that price. A shift in demand in the opposite direction is called a *negative* shift because, after the shift, a smaller quantity than before will be taken at any given price. Such a shift may be illustrated graphically by assuming that the demand changes from the position indicated by curve D' in Figure 2 to that indicated by curve D .

Causes of Shifts in Demand. A positive shift in the demand for a particular good, such as eggs, might result from one, or several, changes in conditions occurring with the passage of time. An increase in population from one year to the next would presumably cause a positive shift in the demand for eggs. Larger quantities would be taken than before at the respective prices, since more people would be consuming eggs. A positive shift in the demand for a commodity may be caused, also, by the development of new uses for it. The demand for automobiles shifted positively as good roads were built. The demand for gasoline, likewise, shifted positively as its use for motor fuel expanded. Advertising, moreover, may bring about a positive shift in the demand curve for one commodity and negative shifts in the demands for other goods. Increases in general consumers' income during boom

periods cause the demand curves for many commodities to shift positively. Conversely, the decline in consumers' incomes that occurs during a depression causes negative shifts in the demand curves of such commodities. Changes in tastes or styles may result in abrupt shifts, either positive or negative, in the demands for many consumers' goods.

Positive and negative shifts in demand are essentially dynamic in character. They are progressive changes that occur with the passage of time. Sometimes they may demonstrate a relatively regular or rhythmic pattern, as do seasonal variations in the demand for some commodities such as ice, sporting goods, and the like. Long-run shifts or trends in demand are illustrated by the more or less regular increase for several decades in consumer purchases of automobiles, and also by the rapid rise of the use of radios. The decline of the bicycle or phonograph industries, on the other hand, illustrates long-run negative shifts in demand.

Sometimes the decline in demand for one commodity can be related definitely to the increase in demand for another that comes to be substituted for it. The displacement of horse-drawn carriages by automobiles, the substitution of gasoline tractors for horsepower or steam power on farms, or the supersession of the phonograph by the radio, furnish striking examples of this connection. For most goods, however, the effect of the growth or decline of demand is widely distributed over the entire range of consumers' goods and cannot be related directly to the fortunes of other specific commodities.

SUBDIVISION OF CONSUMERS' DEMAND

As already pointed out, positive shifting in consumers' demand for a particular commodity or service may be caused by successful advertising. Individual firms, however, are usually less concerned with the promotion of consumers' demand for products of a certain general type (such as cigarettes) than they are with the promotion of the demand for their own particular brand. Consequently, the individual firm endeavors, by its advertising, to convince the consumer that a real differentiation exists between its own product and those of all other competitors. The use of trademarking or branding of products represents the effort to make this differentiation effective and lasting. The extensive advertising of different brands of candies, tobaccos, foods, and, indeed, almost all important lines of consumers' goods exemplifies this tendency.

As a result of successful efforts by sellers to differentiate their products, the total consumer demand for a general class of goods (such as cigarettes) tends to become subdivided. In place of a total consumer-demand curve for cigarettes, there are separate consumer-demand curves for each of the various brands of cigarettes. It is important to realize, of course, that all of these separate demand curves are intimately related to one another, inasmuch as the products are substitutable for one another. The significance of this differentiation of the total demand for a general class of goods into separate parts will become more apparent

in the next section, in which the demand for the product of the individual firm is considered.

DEMAND FOR THE PRODUCT OF THE INDIVIDUAL FIRM

Thus far, demand has been considered in terms of the choices of consumers. It is proposed now to look at consumers' demand from the standpoint of producers and particularly from that of the individual firm. It is necessary, first, to consider how the demand for its own product appears to the individual firm under conditions of pure competition. This will be followed by a consideration of demand as it appears to the individual firm operating under conditions of monopoly or monopolistic competition.

APPEARANCE OF THE DEMAND CURVE TO THE INDIVIDUAL FIRM

Under Conditions of Pure Competition. As already indicated, the chief requisites for the existence of pure competition include trading in a standardized or homogeneous commodity by a large number of both buyers and sellers, so that any unit offered by any seller may be substituted for any other offered by another seller, without inconvenience to anyone.³ This means that for both the individual buyer and the individual seller the total supply and demand are indefinitely large in relation to the transactions to which

³ See above, pp. 43-44.

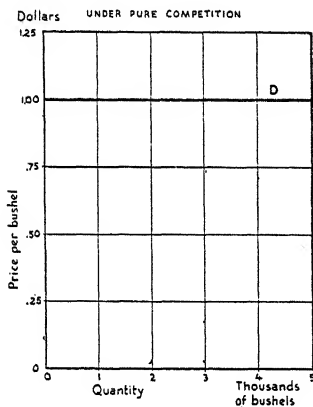
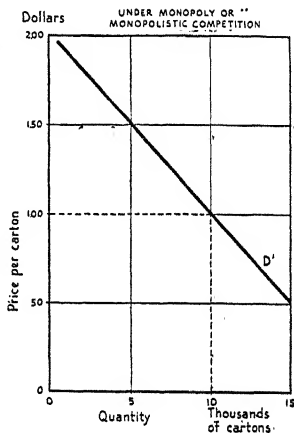
the individual is a party. No matter how much the individual firm may sell, its action will have a comparatively small effect on the total volume offered, since even its maximum output is small relative to the total quantity offered for sale in the market.

So far as the individual seller is concerned, therefore, the demand curve for his own output under conditions of pure competition is virtually a horizontal line, the position of which will not be materially affected by any change in his own individual sales. The height of this horizontal line corresponds with the equilibrium price that prevails under the current conditions of total demand and total supply. This is essentially the situation in which any producer of wheat, potatoes, cotton, or hogs finds himself with respect to the demand for his own output.

Under conditions of pure competition, an individual producer of wheat will therefore look upon the demand for his own output as indefinitely large at the market price, say \$1.00 per bushel. The demand curve for his own output, as he sees it, is represented by the horizontal line in Figure 3a on page 72. Even the greatest possible expansion in his output and sales could not, within any short time, and in the absence of similar action by other producers of wheat, increase the total offerings for sale sufficiently to depress the market price by more than a negligible amount.

Under Conditions of Monopoly or Monopolistic Competition. Under conditions of monopoly, or monopolistic competition, on the other hand, the demand curve for its own product, as it appears to the individual

firm, is a sloped curve. The curve D' in Figure 3*b* depicts the demand curve for a particular brand of cigarettes, as it might appear to the individual firm selling that brand. To the individual firm operating under

FIGURE 3*a*FIGURE 3*b*

DEMAND SITUATION AS IT APPEARS TO THE INDIVIDUAL PRODUCER

conditions of monopoly or monopolistic competition, the demand curve for its product coincides with the total consumer-demand curve, and is negatively sloped. The monopolist cannot, like the producer under pure competition, expand his sales without significantly affecting the price at which he can sell.

THE AVERAGE REVENUE CURVE

The average revenue curve of the individual firm corresponds to the demand curve for its product, if it

be assumed that the individual firm sells all the units of its product at the same price. Thus, in Figure 3a on page 72, curve *D* is not only the demand curve as it appears to the individual producer of wheat, but it indicates the average revenue he would receive at any output. For example, at an output of four thousand bushels his average revenue would equal \$4,000 divided by 4,000, or \$1.00 per bushel.

In Figure 3b on page 72, curve *D'* is not only the demand curve as it appears to the individual seller of a certain brand of cigarettes, but it indicates the average revenue he would receive, differing according to the amount he produced and sold. For example, if he produced and sold ten thousand cartons, the price, according to the demand curve illustrated, would be \$1.00. His average revenue, with an output of that quantity, would be \$10,000 divided by 10,000, or \$1.00.

In the next section, and throughout this book, the term "average revenue curve" will be used in referring to the demand curve for the product of the individual firm.

MARGINAL REVENUE AND THE MARGINAL REVENUE CURVE

Under Pure Competition. The total revenue received from sales by an individual firm is equal to the price multiplied by the quantity of goods sold at that price. For example, if the market price of wheat under pure competition were \$1.00, and the individual producer sold ten thousand bushels of wheat, his total revenue would be \$10,000. If, instead of producing and selling

ten thousand bushels of wheat, this producer had produced and sold eleven thousand bushels, his total revenue would have been \$11,000. The difference between these two total revenues, in this case amounting to \$1,000, is the *marginal revenue* that would be obtained by selling the additional thousand bushels of wheat. The marginal revenue obtainable if *one additional* bushel of wheat were sold would be \$1.00.

A significant feature of pure competition is that under pure competition the marginal revenue obtainable from the sale of an added unit of product is equal to the average revenue, or price. This follows from the assumption that the price of the product will be substantially unaffected by any change in the output or sales of a particular firm. Each additional unit sold will therefore yield the same average revenue to the seller and will add the full amount of the price per unit to the total revenue.

Stated in graphic terms, under purely competitive conditions the demand curve for the product of the individual firm, the average revenue curve for the firm, and the marginal revenue curve for the firm all coincide, and are represented by a horizontal line. In Figure 3a on page 72, for example, the horizontal line *D*, corresponding with a price of \$1.00, is not only the demand or average revenue curve as seen by the individual producer, but also his marginal revenue curve as well. It shows not only the average revenue that he would obtain per unit if he sold different quantities but also indicates the addition to total revenue (that is, marginal revenue) that would result if, with any

given volume of sales, he were to sell one additional unit.

This point is also illustrated in the following numerical table, representing the effect of larger or smaller sales upon the average and marginal revenues of a particular firm under conditions of pure competition.

SCHEDULE SHOWING RELATIONSHIP BETWEEN DEMAND CURVE, AVERAGE REVENUE CURVE, AND MARGINAL REVENUE CURVE OF AN INDIVIDUAL FIRM UNDER CONDITIONS OF PURE COMPETITION

(Illustration based upon a hypothetical example of the demand as it appears to a wheat producer)

MARKET PRICE (1)	QUANTITY THAT WOULD BE TAKEN * (2)	TOTAL REVENUE (1) × (2)	MARGINAL REVENUE (SUCCESSIVE DIFFERENCES IN TOTAL)	AVERAGE REVENUE (TOTAL REVENUE DIVIDED BY RESPECTIVE QUANTITIES)
(Dollars)	(Number **)	(Dollars)	(Dollars)	(Dollars)
1.00	5,000	5,000	1.00	1.00
1.00	5,001	5,001	1.00	1.00
1.00	5,002	5,002	1.00	1.00
1.00	5,003	5,003	1.00	1.00
1.00	5,004	5,004	1.00	1.00

* Under pure competition the consumers will buy, at the market price, any quantity offered by the individual producer.

** The unit is a bushel of wheat.

Under Conditions of Monopoly or Monopolistic Competition. Under conditions of monopoly or monopolistic competition, the demand curve (and average revenue curve) for the product of the individual firm is negatively sloped. As a consequence, larger quantities could be sold only at lower prices and reduced average revenue. This situation is illustrated in the table on

page 78 and also in Figure 4 on page 77. It can be seen that the total revenue increases, rapidly at first and then more slowly, as the number of units sold is increased. For example, only six units could be sold at a price of \$1.40, total revenue amounting to \$8.40, whereas eight units could be sold at a price of \$1.20, yielding a total revenue of \$9.60. The maximum total revenue would be obtained from the sale of ten units at a price of \$1.00; total revenue would then amount to \$10.00.⁴

It will be noted that with every additional sale, the amount added to the total revenue would be less than the average price at which the enlarged output could be sold. In other words, the *marginal revenue* would be less than the *average revenue* obtainable from the sale of an additional unit. This follows because, even though more units were sold, they would have to be sold at a lower price.⁵ Total revenue would reach a maximum when the marginal revenue was zero. At that output the effect of a small addition to the quantity sold would be exactly offset by the effect of the reduction in the price per unit. The sale of a still larger quantity would result in a reduction of total revenue,

⁴ In the table the unit taken is a thousand cartons of cigarettes, and these figures for total revenue are to be correspondingly interpreted. Thus the total revenue is actually \$10,000, being \$10 for each thousand cartons sold.

⁵ Suppose, for example, that six units were produced. They would sell for \$1.40, giving a total revenue of \$8.40. If seven units were produced and offered for sale, they would sell for \$1.30, yielding total revenue of \$9.10. The difference, or margin, is 70 cents, which is the result of two changes: first, the difference in quantity and, second, the difference in price. The seventh unit sold would yield an additional \$1.30; but this would be partially offset by the fact that the other six would also have to be sold at \$1.30 each instead of \$1.40 each. This would involve a loss of 10 cents per unit, or a total loss of 60 cents, leaving 70 cents (that is, \$1.30 minus \$0.60) as the marginal revenue resulting from the sale of seven instead of six units.

because the reduction in price would more than offset the addition to sales.

What has just been said may be verified by a glance at the figures in the table on page 78. The maximum

total revenue of \$10.00 would be obtained by selling ten units at a price of \$1.00. Eleven units could be sold only at a price of 90 cents, yielding a total revenue of \$9.90. The marginal revenue from the sale of the additional unit would be *negative*, that is, —\$0.10. The sale of more units would reduce the total revenue still further, and the marginal revenue would become still more negative.

This situation is depicted graphically

above, in Figure 4, by the steeper slope of the marginal revenue curve as compared with the average revenue curve. The marginal revenue derived from the sale of an additional unit is indicated by the height of the marginal revenue curve above the base line, or rather, by the amount of money (on the price scale) that corresponds to that height. So long as the average revenue curve is declining, the marginal revenue curve will lie below it.

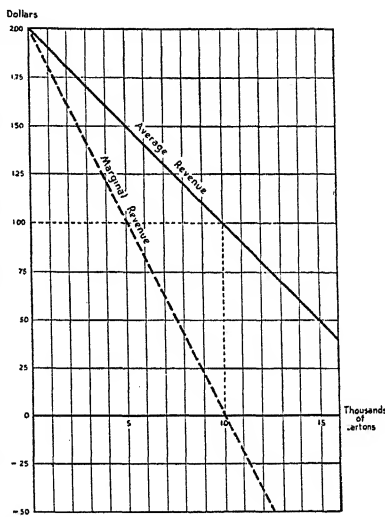


FIGURE 4. AVERAGE AND MARGINAL REVENUE CURVES OF THE INDIVIDUAL FIRM UNDER MONOPOLY OR MONOPOLISTIC COMPETITION

SCHEDULE SHOWING RELATIONSHIP BETWEEN DEMAND CURVE, AVERAGE REVENUE CURVE, AND MARGINAL REVENUE CURVE OF THE INDIVIDUAL FIRM, UNDER CONDITIONS OF MONOPOLY OR MONOPOLISTIC COMPETITION

(Illustration based upon a hypothetical example of the demand for a brand of cigarettes)

PRICE (1)	QUANTITY THAT WOULD BE TAKEN (2)	TOTAL REVENUE (1) × (2)	MARGINAL REVENUE (SUCCESSIVE DIFFERENCES IN TOTALS)	AVERAGE REV- ENUE (TOTAL REVENUE DIVIDED BY RESPECTIVE QUANTITIES)
(Dollars)	(Number *)	(Dollars)	(Dollars)	(Dollars)
1.90	1	1.90	+ 1.90	1.90
1.80	2	3.60	+ 1.70	1.80
1.70	3	5.10	+ 1.50	1.70
1.60	4	6.40	+ 1.30	1.60
1.50	5	7.50	+ 1.10	1.50
1.40	6	8.40	+ .90	1.40
1.30	7	9.10	+ .70	1.30
1.20	8	9.60	+ .50	1.20
1.10	9	9.90	+ .30	1.10
1.00	10	10.00	+ .10	1.00
.90	11	9.90	0	.90
.80	12	9.60	- .10	.80
.70	13	9.10	- .30	.70
.60	14	8.40	- .50	.60
.50	15	7.50	- .70	.50
			- .90	

* The unit is a thousand cartons.

This reflects the fact, already stated, that additional sales, at progressively lower prices for the total quantity sold, will add less than the average revenue to the total revenue.⁶ Thus, in Figure 4, the height of the marginal revenue curve midway between quantity seven and quantity eight on the base line (representing the assumption that quantity increases from seven to eight) is 50 cents, whereas the average revenue for eight units is \$1.20, and is indicated by the point on the average revenue curve directly above 8 on the quantity scale.

As long as the marginal revenue curve is above zero (above the base line) the sale of an additional unit will increase the total revenue. The largest possible total revenue will be obtained by selling the quantity corresponding with zero marginal revenue; that is, the quantity indicated by the intersection of the marginal revenue curve with the base line (namely, ten units). For larger quantities of sales the marginal revenue curve is negative, as is indicated by the downward extension of the curve below the base line. The significance of a negative point on the marginal revenue curve may be illustrated by examining the effects of an increase from twelve to thirteen in the number of units offered for sale:

⁶ A total revenue curve is not shown in this figure. The total revenue obtainable from the sale of any given quantity, however, can be represented by the *area* of a rectangle inscribed in the triangle bounded by the price and quantity axes and the average revenue curve. The height of such a rectangle would thus represent the price, and its base line the quantity sold at that price. The maximum total revenue is represented by the largest rectangle bounded by the average revenue curve and the price and quantity axes. This is the one drawn in Figure 4. The rectangle representing maximum total revenue is obtained by erecting a perpendicular to the base line at the point of zero marginal revenue (that is, at the intersection of the marginal revenue curve with the base line).

UNITS SOLD	PRICE (Average Revenue)	TOTAL REVENUE
12	\$0.80	\$9.60
13	0.70	9.10
MARGINAL REVENUE		— \$0.50

The sale of the additional units would bring in 70 cents additional, but this would be more than offset by the decline of 10 cents in the price of each of the other twelve units, each of which would now sell for 70 cents instead of for 80 cents. This loss totals \$1.20. The negative marginal revenue is therefore —\$0.50 (that is, \$0.70 minus \$1.20 equals —\$0.50).

Elasticity and Inelasticity of Demand. Whenever a lower price would be accompanied by such a small increase in sales as to yield a smaller total revenue, demand is said to be *inelastic*. Under such circumstances, marginal revenue is below zero. On the other hand, whenever a lower price would be accompanied by such an increase in sales as to yield a larger total revenue, demand is said to be *elastic*. Marginal revenue is then greater than zero. If, at a lower price, total revenue would remain unchanged, demand is said to have an elasticity of *unity*. If the increase in total revenue is very large, as a result of a large increase in sales in proportion to the decline in price, the demand is said to be *more elastic* than if the increase is less.

In the illustration in the table on page 78 and in Figure 4, on page 77, for example, the elasticity of demand is greater between prices of \$1.70 and \$1.60 than it is between prices of \$1.50 and \$1.40. With a reduction in price from \$1.70 to \$1.60 the quantity that would be sold increases sufficiently to result in a \$1.30

addition to total revenue. With a reduction in price from \$1.50 to \$1.40, however, the increase in the quantity that would be sold would augment the total revenue by only 90 cents.

In Figure 4, the demand is elastic for all quantities from zero to 10 and is inelastic for larger quantities. So long as the marginal revenue curve is above zero, the corresponding part of the average revenue curve is elastic. If the marginal revenue curve is below zero, the corresponding section of the demand curve is inelastic. The point of unit elasticity on the demand curve corresponds with the point (quantity) at which the marginal revenue curve has a zero value (that is, intersects the base line).

MATHEMATICAL NOTE ON ELASTICITY OF DEMAND

Definition of Elasticity. Students who are mathematically inclined will find it helpful in dealing with elasticity and inelasticity of demand to think of the demand curve as representing q (the quantity that would be taken) as a *function* of p (the price) or p as a function of q .

The elasticity of demand (ϵ) at any given point on the demand curve is the ratio of the relative change in quantity, $\Delta q/q$, to the relative change in price, $\Delta p/p$, when these are infinitesimally small. Thus, mathematically,

$$(1) \quad \epsilon = \frac{dq/q}{dp/p} = \frac{p}{q} \frac{dq}{dp}$$

Since q decreases as p increases, dq/dp will be negative. Hence ϵ will be negative. Also, since $dq/q = d \log q$ and $dp/p = d \log p$,

$$(2) \quad \epsilon = \frac{d \log q}{d \log p}$$

According to this formula elasticity of demand could be defined as the ratio of the logarithmic differential of demand to the logarithmic differential of price.

Although graphically p is customarily measured on the vertical scale and q on the horizontal scale, in connection with the concept of elasticity, p is usually taken as the independent variable and q as the dependent. It is apparent from (1) above, that the elasticity at any given point is dependent upon the slope of the demand curve. Since the slope, using p as the ordinate and q as abscissa, is dp/dq , formula (1) shows that the elasticity is inversely proportional to the slope; because $dp/dq = \frac{1}{dq/dp}$. Hence the steeper the slope, the less the elasticity.

Quantitatively, elasticity may be greater than unity, equal to unity, or less than unity. When greater than unity, the demand is said to be elastic; when less than unity demand is inelastic. The equation for the demand curve shown in Figure 4 on page 77 is $AR = \$2.00 - .1 q$. The elasticity is greater than one for values of AR (or p) higher than \$1.00, and the elasticity is less than one for values of p lower than \$1.00. At \$1.00, elasticity of demand is unity.

Constant Elasticity of Demand. If elasticity of demand is a constant, and a specific value given, that is,

$$\epsilon = -1$$

equation (2) above becomes

$$(3) \quad -1 = \frac{d \log q}{d \log p}, \text{ or } d \log q = -d \log p$$

which can be integrated to give

$$(4) \quad \log q = -\log p + \log c, \text{ or } \log pq = \log c \\ \text{or } pq = c$$

If a specific value is assigned to the constant, c , an equation for a demand curve with constant unit elasticity is obtained, for example,

$$\text{Curve A} \quad pq = 16$$

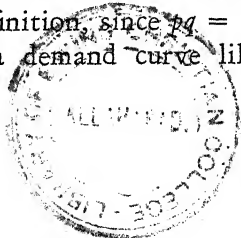
Similarly, if the specific value of $-\frac{1}{2}$ is given for elasticity, and the constant specified is 8, the procedure just outlined would give an equation for a demand curve with constant elasticity of $-\frac{1}{2}$, for example,

$$\text{Curve B} \quad p^{\frac{1}{2}}q = 8$$

Finally, if the specific value of -2 is given for elasticity, and the constant specified is 64, the procedure outlined would give an equation for a demand curve with constant elasticity of -2 , for example,

$$\text{Curve C} \quad p^2q = 64$$

In the case of a unit elastic demand curve, A , the total revenue from sales remains constant throughout the entire curve, by definition, since pq = total revenues. In the case of a demand curve like B



with elasticity less than unity, the change in quantity, with a given change in price, necessary to keep the constant relationship ($p^{\frac{1}{2}}q = 8$) must be such that pq (total revenue) will always decrease with a decrease in p . On the other hand, in the case of a demand curve like C with elasticity greater than unity, the change in quantity, with a given change in price, necessary to keep the constant relationship ($p^{\frac{1}{2}}q = 64$) must be such that pq (total revenue) will always increase with a decrease in p . With demand curve B small changes in q will suffice to maintain this constant relationship, and the demand is therefore said to be inelastic; with demand curve C large changes in q are required to maintain the constant relationship, and the demand is therefore said to be elastic. For goods with elasticities of demand greater than unity the total revenue increases as price declines, whereas with elasticities of less than unity total revenue diminishes as price declines.

Relationship between the Average Revenue and Marginal Revenue Curves. The simplest way to show the relationship between the average revenue and marginal revenue curves is to derive the total revenue curve from the average revenue curve; thus, in the example shown in Figure 4 and the table on page 78,

$$AR = \$2.00 - .1 q \quad \text{But total revenue} = AR \times q, \text{ so} \\ TR = \$2.00 q - .1 q^2$$

The marginal revenue curve is obtained by differentiating with respect to q the equation for the total revenue curve; thus,

$$MR = \$2.00 - .2 q$$

CHAPTER V

Analysis of Supply: Cost of Production

THE MEANING OF SUPPLY

GENERAL DEFINITION OF SUPPLY

Supply and Demand as Parallel Terms. In the exchange process supply is the complement of demand. The supply side of the market for a commodity includes all traders who possess such commodities and wish to exchange them for money (or other goods representing purchasing power), while the demand side includes all traders who possess money or purchasing power and wish to exchange it for such goods. The term "supply" is used to describe the fact that, other things being equal, a smaller quantity of a particular good would tend to be offered for sale at a low price than would be offered at a higher price.¹

¹ To give specific significance to the term "supply" it is necessary, as indicated in the previous chapter with respect to demand, to define the area that is regarded as constituting the market, and to specify also the nature of the commodity considered. The supply of large-size anthracite coal in New York City is obviously not the same thing as the supply of coal of all sizes in the New York metropolitan area.

This general characteristic of the supply side of the exchange process is represented graphically or figuratively by the *supply schedule* or *supply curve* for the commodity in question. Thus, although a somewhat larger quantity would be offered for sale at a given time if the price were higher than it actually is, and a somewhat smaller quantity would be offered if the price were lower, these different quantities, corresponding with different possible prices, are all regarded as constituting a single supply situation. So long as other conditions remain unchanged, variations in offerings simply represent different points on the supply curve that are disclosed by price variations. Such variations do not constitute changes in supply.

Changes in supply, like changes in demand, result from alterations in general conditions. These may produce shifts in the position of the supply curve, or alteration in its shape, or both. Shifts and changes in the shape of the supply curve are, in general nature, similar to the shifts and changes in the shape of the demand curve, although attributable to somewhat different causes. It is therefore not necessary at the present point to undertake a detailed discussion of these changes. Some of the forces producing changes in the supply curve for particular products will be indicated in later chapters.

As the supply of a given commodity is defined in terms of willingness to sell, it should not be confused with the current production of that commodity, or even with the stocks in possession of the sellers, so long as any part of the production or stocks would be with-

held from sale should the price fall below a given level. Within a period of time sufficient to permit production to be adjusted to changes in demand conditions, however, "output produced" and "supply" will correspond.

Market Supply and Supply by the Individual Firm. The great variety of situations surrounding the exchange of goods has already been indicated. In some instances there are many producers of similar goods offering their wares in direct rivalry with one another, in others the rival sellers are few. In still other cases there is only one seller of a particular type of good. It is essential to note that where the same sort of good is produced and sold by more than one firm, the total supply offered in the market at any price is the sum of the quantities that would be offered by each of the rival sellers at that price. Thus, in order to understand the forces affecting the total supply offered for sale in the market, it is necessary to start with the conditions determining the quantity that the individual firm would be prepared to sell at various possible prices.

SIGNIFICANCE OF COST OF PRODUCTION

At first glance no very serious difficulties seem to be involved in explaining the behavior of the individual business enterprise with respect to market offerings and prices. It seems reasonable to suppose that each firm would sell as much as it profitably could, and that the actual quantity produced and offered for sale would depend upon the cost of producing the article. If prices were in excess of cost, it would be advantageous to pro-

duce and sell more. If prices should fall below costs, production would be curtailed, offerings would be reduced relative to the quantity demanded at the low prices, and an eventual readjustment brought about. The quantity demanded and the quantity offered would be equal, and price would be stable, when prices had been brought into line with costs. If there were several rival firms producing the same commodity, full stability would be achieved when each of them had discovered the adjustment of output, price, and costs that was most satisfactory for it under existing conditions. This would mean that no change that any individual producer could make would improve his position, for the time being, from the standpoint of earnings. This would be his optimum productive position.

This rough description of the basic relationships between costs of production and the prices of particular commodities falls short of being an adequate description of the processes of supply and price adjustment.² Instead it simply suggests the necessity of undertaking a more precise study of the relationships between prices and costs, and, at the same time, a more detailed consideration of the various elements that constitute the costs of production.

Relationship of Supply, Prices, and Costs Not Direct.
The need for further investigation arises, in the first

²It should be noted that, in the above and subsequent discussion, the relationships between costs and the selling price of a certain commodity are being considered. If the economic structure as a whole is analyzed, the costs are themselves part of the whole system or structure of prices. See below, Chapters XIV-XVI.

place, out of the fact that the relationship between prices and costs, through adjustments in supply, is not immediate or direct. This is clearly evident in the instance of goods that have already been produced and are on hand for sale. So far as they are concerned, the costs incurred in their production cannot directly influence the prices for which they are sold. Should an unexpected popularity attach to a certain style of clothing, for example, merchants having that style in stock may be able to obtain prices that are higher than had been expected, and greater than the cost of producing the stocks on hand. If, on the other hand, a style proves less popular than had been anticipated, the merchandise may be unsalable at a price sufficient to equal the cost of production. If such goods are to be sold, the prices must be reduced.

Cost of New Production. Although the prices of goods already produced are, therefore, virtually independent of the costs incurred in producing them, this does not mean that there is no relationship between prices and costs. On the contrary, the prospective costs of production must be taken into account when plans for new production are being made. Presumably no producer will willingly undertake production for sale unless he believes that the prospective selling price will be adequate to recompense the outlays that must be incurred. If prices are expected to be low in comparison with costs, the quantity produced for sale will tend to be curtailed.

As a prelude to a more detailed consideration of the relationships between costs and supply, it is desirable

to investigate more fully the nature and behavior of the costs of the individual producing firm. With this study of costs as a background the subsequent chapters will then proceed to the further analysis of supply.

MAJOR TYPES OF COST

Production is a process that goes on from day to day, week to week, or year to year. It is necessary to remember, therefore, in speaking of the cost of producing a given quantity of product, that this means the production of that quantity within some specified production period taken as a unit of measurement. This period may be a day, a month, a year, or more. Differences in size of firms are reflected in the relative quantities of product that each can produce within some such specified period of time.

In analyzing the cost of producing a given output within a specified period of time, two major types of cost are encountered. The first type includes outlays that, within the production period under consideration, would not vary, whether the volume of output was large or small. Such costs are termed *overhead costs*. Other outlays, whose amount is affected by the volume of output within the production period, are referred to as *variable costs*.

OVERHEAD COST

Among the outlays or allowances that are unaffected by the quantity of output produced within a given pro-

duction period may be included certain types of taxes, the salaries of essential managerial and office employees whose services are required regardless of volume of business, provision for the replacement of facilities when worn out or obsolete, and finally, return on the investment of capital in land, plant, and facilities.³ If production is to be maintained permanently at a given level, sufficient payments must be made in all these different ways to preserve the business organization intact. For present purposes, however, it is convenient to concentrate attention on that part of the overhead cost representing return on investment in the enterprise, because the decision as to the scale of productive activities rests, first of all, in the hands of the owners.

Under modern conditions of production there are comparatively few commodities whose preparation for market does not require extensive investments in fixed plant and equipment before the first consignment has been turned out and shipped. Once these original investments in fixed forms have been made, the durable physical plant and facilities, so acquired, stand ready for use in production, whether or not they are used to full capacity. In calculating the total cost of production of the goods turned out in a given period of time (whether the quantity represents the full capacity of the plant or less), it is necessary to include an allowance of a minimum rate of interest on the investment in

³It should be noted that the term "overhead cost" includes not only certain cash payments that have to be made to others, during any production period, but also certain other items that, at the time, appear only on the books of the firm. Payments that must be made to others, such as interest, rentals for property held on long-term leases, and taxes, are commonly referred to as "fixed charges."

productive facilities. This does not mean that production would be discontinued if the full return on their investment was not obtained by the owners, because if the plant were closed they would get nothing.

It is clear, then, that it would be to the advantage of the owners of a business to have its productive facilities constructed on the scale best adapted to the actual output. The necessity of making investments in durable plant and equipment in advance, however, on the basis of estimates of future demands, frequently results in the construction of facilities on a scale either larger or smaller than that best adapted to the use actually made of them in any given production period.

This hazard exists because technical considerations ordinarily require that a plant be laid out and its facilities co-ordinated on the assumption that some given volume of output will be attained within a reasonable length of time. Of course, the actual attainment of such a level of output will depend upon the ability to sell the product. Within certain limits, actual production may run below or above that assumed by the engineers in designing the plant, without necessitating material rearrangement or alteration of the machinery and layout. Nevertheless, if either a higher or lower normal volume had been anticipated, a different arrangement, or perhaps even totally different methods of production, might have been technically superior. If an automobile assembly plant, for example, were designed for an output of fifty thousand cars per year, it might be possible to increase the volume to seventy-five thousand, or reduce it to thirty thou-

sand. However, if the plant were being built anew for a normal output of either seventy-five thousand or thirty thousand the technical layout, machinery, and other facilities, would almost certainly be different in some respects.

Adjustments from a lower volume of output to a higher one, or vice versa, can rarely be made smoothly. More commonly, extensive changes in technique, methods, or facilities must be made at one time, involving substantial investments of additional capital. If, for example, the traffic on a single-track railway line increases in density to a point where congestion seriously interferes with efficiency of operation, double tracking of the line will more than double the carrying capacity and will relieve the congestion. Such relief, however, cannot be obtained at all until the double tracking of the vital sections has been completed. The volume of traffic may then be as far below the technical optimum density of the rebuilt line as it was above the optimum for the single track. Under such circumstances the existence of some *unused capacity* is almost inevitable.

Thus, in summary, heavy investments necessary to inaugurate new production, or to enable an increase in the volume of production, can seldom be recovered once they have been "sunk" in fixed plant and equipment. Interest on such investments, expenditures to maintain plant and equipment intact, and other outlays necessary to maintain the firm as a going concern, continue whether or not production is carried on. Such items taken together constitute total overhead cost,

whose amount does not change as the volume of production varies.

VARIABLE COST

The most usual situation is one in which a part of the total cost of production is fixed in amount and a part is *variable* with output. The variable part of cost of production will ordinarily include different types of outlay. Some of these tend to vary in total amount directly in proportion to changes in output. Others tend to change in total amount in greater or lesser degree than does total output.

For the most part, expenditures for raw materials, certain classes of labor, and the like, are likely to increase or decrease in nearly the same proportions as output increases or decreases. An increase in the output may, however, involve a more than proportionate increase in variable cost, if, for example, it is necessary to pay for overtime labor at advanced rates, or to hire additional laborers who are less efficient than the workers already employed. It may, indeed, be necessary to pay higher wages to certain classes of workers if the increase in the output of the firm would make a sufficient difference in the total demand for such labor as to affect its price. The same thing may be true of purchases of certain materials.

An expansion in the volume of output may, on the other hand, make possible some economies not otherwise attainable. Larger purchases of materials may bring further discounts, or lead to changes in the conditions under which the materials are produced, which

result in the reduction of their prices. Furthermore, enlarged output may make possible a greater subdivision of labor within the plant. Such economies tend somewhat to limit the increase in total costs as volume of output increases, and would be reflected in some lowering of variable cost per unit of product.

JOINT COSTS

By-Products and Joint Costs. There are many industries in which the production of one commodity is necessarily accompanied by the production of another, in more or less complete form. In the copper industry, for example, silver is frequently produced as a by-product, because the two metals are found together in varying proportions in the same ore. The same thing is true in many other branches of the chemical, metallurgical, and other processing industries.

The mere fact that two products are made in the same plant does not make them joint products; strictly speaking, they are joint only when the volume of output of the one cannot be *independently* controlled. In the packing industry, for example, meat and hides are joint products, because the quantity of hides produced is fixed by the volume of meat produced, and vice versa. In the railroad service, passenger and freight carriage are not joint, because either may vary independently of the other. East-bound and west-bound services, either passenger or freight, are joint services, rendered at joint cost, because the movement of equipment in one direction necessitates its return movement. Thus, shipments or passenger movements in one direc-

tion make equivalent service in the opposite direction available, whether or not there is a demand for it.

Where there are two or more joint products, the proportions in which they emerge from the production process may be either *variable* or *invariable*. In the oil industry the proportions are variable within limits. The output of gasoline, as compared with the heavier petroleum products, may be increased relatively by alterations in technical processes, such as "cracking" and hydrogenation, which serve to convert some of the heavier fractions into gasoline.

In the course of time, a secondary product may become the principal product by reason of a change in the demand. Before the rise of the automobile, gasoline was a relatively useless by-product of the production of kerosene, and explosions of kerosene lamps were frequently attributed to the adulteration of the kerosene with the more volatile gasoline and naphtha. With the development of the automobile the demand situation was reversed; gasoline became the dominant product, and the production of other oils and residue became dependent upon the quantity of gasoline produced.

Time Jointness. A situation similar to those just described exists where productive facilities must be constructed on a scale sufficiently large to meet the peak demands of the market, but are not used at a constant rate throughout the day, the week, or the season. Notable examples are afforded by the telephone, electric, gas, and other public service industries. The physical facilities for the supply of gas, electricity, or telephone

service must be sufficient to meet, not merely the *average* daily, weekly, or yearly requirements of the consumers, but the *maximum* simultaneous demands of the entire group served.

Since the peak load, or maximum utilization, of such services is likely to be concentrated in certain hours of the day, there may be great variations in the actual degree of utilization of the facilities from one time of day to another. Nevertheless the services must constantly be available upon demand. Some adjustment to this variation may be made, as, for example, the banking of fires in generating stations at off-peak hours, or the filling of gas holders or reservoirs at periods of slack use. Much of the day, however, may be characterized by the existence of *unused* capacity. Under such circumstances, the possibility of rendering service at off-peak hours exists, independently of the demand for such service, and the additional cost of rendering such service would be comparatively small.

EFFECTS ON COST OF VARIATIONS IN OUTPUT

The discussion of overhead and variable cost in the preceding section has shown that for most industries the cost of production per unit of product varies, in greater or less degree, as the output is increased or decreased, depending upon the respective importance of overhead and variable elements in cost.

The cost conditions surrounding the production of a given output by a firm may be expressed in terms of the *total cost* of producing that output, in terms of *average cost*, or in terms of *marginal cost*. These three ways of expressing cost conditions will be illustrated and explained in the following sections. Each helps to throw some additional light on the conditions that influence the policy of the producer with respect to output and price and thus affect the supply of the commodity in question.

TOTAL COSTS

The total cost of producing a given number of units of a certain product is equal to the sum of the overhead cost of the business plus the variable cost. The influence of changes in output upon total cost is illustrated by two examples, in Tables *A* and *B* on pages 99 and 100. In the first case it is assumed that changes in output involve directly proportional changes in the aggregate variable costs. In the second case it is assumed that changes in variable cost are not strictly proportional to variations in output, but instead that variable cost tends to increase in greater proportion than output.

It is sometimes convenient, in economic investigation, to concentrate attention on the behavior of variable cost, leaving the overhead cost out of account because it does not respond to changes in output. The term "total variable cost" will be used to indicate the aggregate variable cost of producing any given quantity of output, as distinguished from the total cost, in which overhead is included.

AVERAGE COST

The average cost, or cost per unit, of producing a given output can be ascertained by dividing the total cost of production by the number of units of output.

TABLE A

VARIATIONS IN AVERAGE OVERHEAD, AVERAGE VARIABLE, AND AVERAGE COSTS WITH VARIATION IN OUTPUT

A — Effect of Overhead Cost in Combination with Uniform Variable Cost

NUMBER OF UNITS	TOTAL OVERHEAD COST	TOTAL VARIABLE COST	TOTAL COST	AVERAGE OVERHEAD COST	AVERAGE VARIABLE COST	AVERAGE COST
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	100	20	120	100.0	20	120.0
2	100	40	140	50.0	20	70.0
3	100	60	160	33.3	20	55.3
4	100	80	180	25.0	20	45.0
5	100	100	200	20.0	20	40.0
6	100	120	220	16.7	20	36.7
7	100	140	240	14.3	20	34.3
8	100	160	260	12.5	20	32.5
9	100	180	280	11.1	20	31.1
10	100	200	300	10.0	20	30.0
11	100	220	320	9.1	20	29.1
12	100	240	340	8.3	20	28.3
13	100	260	360	7.7	20	27.7
14	100	280	380	7.1	20	27.1
15	100	300	400	6.7	20	26.6
16	100	320	420	6.3	20	26.3
17	100	340	440	5.9	20	25.9
18	100	360	460	5.6	20	25.6
19	100	380	480	5.3	20	25.3
20	100	400	500	5.0	20	25.0

It will be noticed that it is *total* overhead cost that remains constant as output is increased, and *total* variable cost that is variable. On the other hand, average overhead cost varies with output, while average variable cost is relatively uniform.

In Table B, for example, the total cost of producing ten units is 325. The average cost, therefore, is 32.5.

Average Overhead Cost. It should be noted that one can also ascertain in the same way the average overhead cost and the average variable cost of producing a

TABLE B

VARIATIONS IN AVERAGE OVERHEAD, AVERAGE VARIABLE, AND AVERAGE COSTS WITH VARIATION IN OUTPUT

B — Effect of Overhead Cost in Combination with Nonuniform Variable Cost

NUMBER OF UNITS	TOTAL OVERHEAD COST	TOTAL VARIABLE COST	TOTAL COST	AVERAGE OVERHEAD COST	AVERAGE VARIABLE COST	AVERAGE COST
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	100	20	120	100.0	20	120.0
2	100	40	140	50.0	20	70.0
3	100	60	160	33.3	20	53.3
4	100	80	180	25.0	20	45.0
5	100	100	200	20.0	20	40.0
6	100	123	223	16.7	20.5	37.2
7	100	147	247	14.3	21.0	35.3
8	100	172	272	12.5	21.5	34.0
9	100	198	298	11.1	22.0	33.1
10	100	225	325	10.0	22.5	32.5
11	100	253	353	9.1	23.0	32.1
12	100	282	382	8.3	23.5	31.8
13	100	312	412	7.7	24.0	31.7
14	100	343	443	7.1	24.5	31.6
15	100	375	475	6.7	25.0	31.7
16	100	416	516	6.3	26.0	32.3
17	100	459	559	5.9	27.0	32.9
18	100	504	604	5.6	28.0	33.6
19	100	551	651	5.3	29.0	34.3
20	100	600	700	5.0	30.0	35.0

It will be noticed that the only difference between Tables A and B is that, in the latter, total variable cost increases more rapidly beyond the fifth unit of output, which results, of course, in different average variable and average costs for such outputs.

given quantity of output. The average overhead cost is determined by dividing the total overhead cost by the number of units produced. If the volume of output is large, the amount of overhead cost attributable to a single unit of product is small, because the total is divided among a large number of units. If the volume of output is small, the average overhead cost is large. The effect of variations in the quantity produced is illustrated graphically by the *AOC* curve in Figure 5, and numerically in columns 5 in Tables *A* and *B*.

Average Variable Cost. The average variable cost represents total variable cost di-

vided by the number of units produced. Average variable cost may become either larger or smaller as output is increased, depending upon whether the change in total variable cost is more or less than proportionate to the change in output. If average variable cost remains uniform, no matter how the output per unit is increased, the effect of decreasing average overhead cost will be

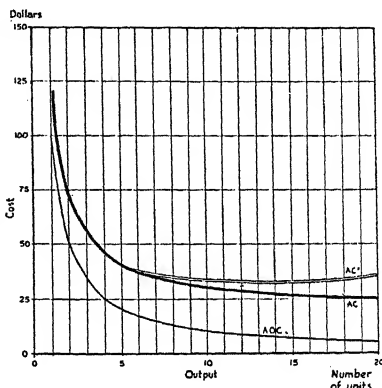


FIGURE 5. AVERAGE OVERHEAD AND AVERAGE COST CURVES OF A PARTICULAR PRODUCER UNDER CONDITIONS WHERE

- (A) UNIFORM VARIABLE COST IS COMBINED WITH OVERHEAD
- (B) NON-UNIFORM VARIABLE COST IS COMBINED WITH OVERHEAD

to give a continuous downward trend to average cost with increasing volume of output. This situation is illustrated by the curve AC in Figure 5, and in column 7 of Table *A*. If, on the other hand, variable cost tends to rise with progressive expansion of output, the effect would be to give an ultimate upward bent to the average cost curve. This is illustrated by the curve AC' in Figure 5, and in column 7 of Table *B*.

Average Cost and Optimum Output. For any given plant there will be some definite output at which the average cost of production would be at a minimum. This is the *optimum output* for that particular plant. Production at less than the optimum volume of output would be accompanied by higher average cost, because the average overhead would be greater with the reduced number of units of product. The production of more than the optimum volume of output would be accompanied by a reduction of the average overhead cost, but it would involve greater average variable cost because of the less efficient utilization of labor and materials under rush conditions.

In connection with the very high average cost of producing a few units, suggested by the illustrations on pages 99 and 100, it should be remembered that if a producer expected to produce only one, or a few units (such as steamships) he would not make an investment of capital in plant and equipment capable of turning out ten or twenty units in a given production period. Instead, he would produce the few units by quite different techniques that required less fixed plant

and a larger utilization of the variable elements of cost, especially labor.

MARGINAL COST

Definition. The term "marginal cost" is applied to the increase in total cost of production that would result from a small increase in the quantity produced. Marginal cost is related to average cost in the same way that the marginal revenue of a firm is related to its average revenue from sales. In either case, the marginal part is the increment in total that results from a small increase in the volume of output or sales.

Suppose, for example, that the total cost of producing a thousand pairs of shoes was \$3,000, and that the total cost of producing a thousand and one pairs of shoes was \$3,002. The addition to total cost necessary to produce an additional pair of shoes, namely \$2.00, would be the *marginal cost* of producing the thousand and first pair of shoes. In this instance the marginal cost of producing the shoes is assumed to be less than the average cost (\$3.00), but it might be more. Whether marginal cost is greater, or less, than average cost depends, first, upon the way in which variable cost changes in response to a variation in output and, second, upon the relative proportions of overhead and variable cost elements in the average cost of the product.

RELATIONSHIPS OF AVERAGE, AVERAGE VARIABLE, AND MARGINAL COSTS

The foregoing discussion has shown that the effects of a variation in output upon cost of production can be

stated in terms of changes in total cost, average cost, or marginal cost. Furthermore, it has been seen that the changes in average cost of production accompanying changes in volume of production depend upon the

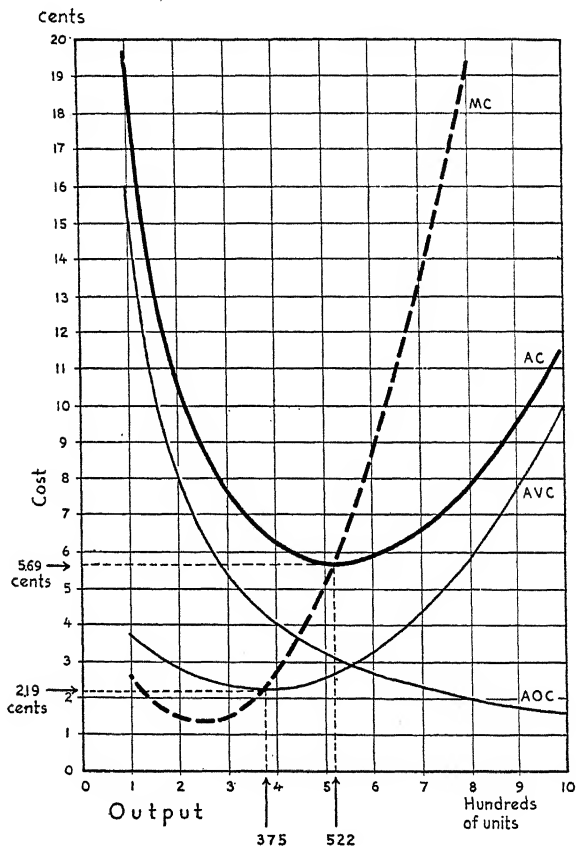


FIGURE 6. RELATIONSHIPS OF AVERAGE, AVERAGE VARIABLE, AND MARGINAL COSTS

relative importance of overhead as compared with variable cost. In the analysis of the conditions determining the volume of output that will be actually produced and sold by a firm, however, the most important factors to be considered are the changes in average cost, average variable cost, and marginal cost that accompany changes in output.

Average, Average Variable, and Average Overhead Costs. The relationships between these various cost elements are illustrated by the cost curves in Figure 6, and by the numerical figures shown in the table on page 106. Quantities are expressed in hundreds of units of output, costs in terms of cents. The first point to be noted is that the curve of average cost, *AC*, is the sum of the two other average curves, the average overhead cost curve, *AOC*, and average variable cost curve, *AVC*. This is evident also in the table of figures.

The average cost curve has a "U" or "dished" shape, because, for smaller outputs (from one hundred to 5.22 hundred units) the reduction in average overhead cost resulting from a given increase in output is more than sufficient to offset any rising tendency of average variable cost. This rising tendency in average variable cost, in this illustration, begins when output is increased beyond 3.75 hundred units. It does not become sufficiently great, however, to offset the decline in average overhead cost until production exceeds 5.22 hundred units.

Thus, up to an output of 3.75 hundred units the decline in average cost is accounted for by the decline

ILLUSTRATION OF RELATIONSHIPS BETWEEN FOUR PRINCIPAL
ELEMENTS OF COST AND OUTPUT

(Period of Time assumed to be One Week)

OUTPUT	AVERAGE OVERHEAD COST*	AVERAGE VARIABLE COST	AVERAGE COST †	MARGINAL COST
(1)	(2)	(3)	(4)	(5)
<i>(In hundreds of units)</i>	<i>(Cents)</i>	<i>(Cents)</i>	<i>(Cents)</i>	<i>(Cents)</i>
1	16.0	3.7	19.7	2.6
2	8.0	2.8	10.8	1.4
3	5.3	2.3	7.6	1.4
3.75 ‡	4.26	2.19 ‡	6.45	2.19 ‡
4	4.0	2.2	6.2	2.6
5	3.2	2.5	5.7	5.0
5.22 φ	3.07	2.62	5.69 φ	5.69 φ
6	2.7	3.2	5.9	8.6
7	2.3	4.3	6.6	13.4
8	2.0	5.8	7.8	19.4
9	1.8	7.7	9.5	26.6
10	1.6	10.0	11.6	35.0

* Total overhead cost per week is assumed to be \$16. Each of the figures in Column 2 is thus found by dividing \$16 by 100, 200, 300, etc.

† The items in this column are the sums, respectively, of the items in Columns 2 and 3.

‡ At output of 3.75 hundred, $MC = AVC$, and AVC is at its minimum.

φ At output of 5.22 hundred, $MC = AC$, and AC is at its minimum.

in both average overhead cost and average variable cost. Between outputs of 3.75 and 5.22 hundred units, average variable cost is rising, but the continuing decline in average overhead cost is sufficient to offset the rise. With output beyond 5.22 hundred units, however, the rapid rise in average variable cost more than offsets the decline in average overhead cost, so that beyond that output the average cost also rises.

Marginal, Average, and Average Variable Costs. The relationships between the marginal cost curve, on the one hand, and the average cost and the average variable

cost curves, on the other hand, are also important. When average variable cost is falling, marginal cost will be less than average variable cost. When average variable cost is at the minimum, marginal cost will equal average variable cost. When average variable cost is rising, marginal cost is greater than average variable cost, and is also rising more rapidly than average variable cost. This is bound to be true, because of the nature of the relationships between these cost elements. Average variable cost can decline with an increase in output only if the cost of each additional unit of output is less than the average variable cost of the immediately preceding (smaller) output. If the additional cost is exactly equal to the average variable cost of the preceding (smaller) output, average variable cost will remain constant; if it is greater, average variable cost will increase.

The same is true of the relationship between marginal cost and average cost. As long as average cost is falling, marginal cost must be below average cost; if average cost is rising, marginal cost must be greater than average cost.

It follows from what has just been said that the marginal cost curve will cut the average variable cost curve at its lowest point, and will also cut the average cost curve at its lowest point. Average variable cost equals marginal cost at an output of 3.75 hundred units, and marginal cost equals average cost at output of 5.22 hundred units. These points are shown in Figure 6, and by the italicized items in the table on page 106.

Although there are three average cost curves (average cost, average overhead cost, and average variable cost),

there is only one marginal cost curve. This follows from the fact that the marginal cost curve indicates the changes in *total* cost that occur with changes in output. By definition the overhead cost remains unchanged; therefore the variation in total cost must result solely from changes in variable cost with changes in output. Hence marginal variable cost and marginal cost are identical. Only the simpler term "marginal cost" need be used.

In the analysis to follow in subsequent chapters, three of the cost curves discussed in this chapter will be used: the average cost curve, the average variable cost curve, and the marginal cost curve. For this reason, the emphasis in the above discussion has been placed upon the mutual relationships of these three cost curves.⁴

IMPORTANCE OF TIME REQUIRED FOR ADJUSTMENT

Overhead versus Variable Cost. The length of time available for adjustment plays a very large part in any consideration of the relationships between costs, supply, and price. The significance of time required for adjustment, indeed, constitutes the center about which the discussion in the three ensuing chapters chiefly revolves. For the present it is sufficient to point out the fact that a sharp distinction between overhead and variable costs can be drawn only when a short period of time is considered. Within such a period, certain

⁴For a mathematical explanation of the relationships thus far discussed, see the note at the end of this chapter.

outlays for plant and facilities, and even for some types of personal services, have already been made, and therefore can be treated as overhead items in determining the cost of production for that period of time.

Over a longer period of time, if a change in the volume of output is foreseen, it is usually possible to make changes in the amount of investment in plant and facilities with which to produce the changed output. Under such circumstances a larger or smaller part of these items of investment becomes responsive to changes in output, or, in other words, a part of variable cost. Thus, the division of total cost into overhead and variable costs depends on the time assumed to be available for adjustment to a particular set of demand conditions.

Overhead versus Joint Cost. Care is necessary to avoid a confusion of the problems of overhead cost with those of joint cost. The overhead cost problem, however, arises out of the fact that many outlays must be made before any product is made and sold. Variations in average cost may, therefore, result simply from deviations of the actual volume of output from the optimum output. The overhead cost problem is essentially a short-run problem, because, over a longer period, the total cost, volume of production, and price will tend to be readjusted as new facilities are constructed, or existing facilities allowed to wear out. This is equivalent to saying that, if a sufficient period of time is allowed for adjustment, investments in durable forms are also flexible, and so assume the character of variable cost;

that is, they can be adjusted to the prevailing volume of output.

The problem of joint cost, on the other hand, is not due to temporary deviations of price and output from established or expected relationships, but to a permanent indivisibility of the processing of the joint products. So long as the peak demand for electric power continues to rise, the construction of plant to meet that demand will concurrently increase the capacity to serve off-peak demands. In like manner an increased demand for beef, leading to an increased production and slaughter of steers, will automatically increase the quantity of hides and other by-products available. Therefore, no matter what the length of time available for adjustment or the extent to which variations in output can be foreseen, the phenomena of joint cost remain.

SUMMARY

In this and the immediately preceding chapters, the discussion has provided, first, a general description of the exchange process and of the market structure; second, a study of consumer demand; and third, a study of elements in costs of production. It is the purpose of the following chapters to show how the cost conditions surrounding the particular producers, taken in conjunction with the conditions of demand, combine to determine the volume of production and price. This is best accomplished by giving attention, first to the current or short-period situation, and thereafter to the relationships that exist over a longer period of time.

MATHEMATICAL NOTE ON COST CURVES

Relationships between Cost Curves. Students with some mathematical training will find it easy to interpret the relationships of the various cost curves in terms of their mathematical equivalents. The equations for the various curves, used for Figure 6, on page 104, and their interrelationships are as follows:

$$MC = 5 - 3q + .6q^2$$

If the equation for the marginal cost curve is then integrated with respect to q , taking as the constant the amount of overhead cost, namely 16, the result is the total cost curve, as follows:

$$TC = 16 + 5q - 1.5q^2 + .2q^3$$

From the total cost curve, the average cost curve is readily obtained by dividing by q , as follows:

$$AC = \frac{16}{q} + 5 - 1.5q + .2q^2$$

This equation consists of the two elements, average overhead cost and average variable cost, which can be written separately, as follows:

$$AOC = \frac{16}{q}$$

and

$$AVC = 5 - 1.5q + .2q^2$$

Minimum Points in Average and Average Variable Cost Curves. That the marginal cost curve necessarily intersects the average cost curve and the average variable cost curve at their respective minima can be demonstrated as follows:

Consider T as total costs, made up of two functions related to q ; namely, variable cost, V , and overhead cost, O ; q represents the amount of output.

The first derivative of $\frac{T}{q}$ would be of the character

$$\begin{aligned} \text{and hence } d\left(\frac{u}{v}\right) &= \frac{vdu - u dv}{v^2} \\ d\left(\frac{T}{q}\right) &= \frac{q dT - T dq}{q^2} \\ \frac{d}{dq}\left(\frac{T}{q}\right) &= \frac{q}{q^2}\left(\frac{dT}{dq}\right) - \frac{T}{q^2} \\ \frac{d}{dq}\left(\frac{T}{q}\right) &= -\frac{T}{q^2} + \frac{1}{q}\frac{dT}{dq} \end{aligned}$$

To find the point where average cost, $\frac{T}{q}$, is a minimum, set this derivative equal to zero, at the same time reducing to a simpler form by multiplying through by q ,

$$\frac{T}{q} = \frac{dT}{dq}$$

But $\frac{dT}{dq}$ is marginal cost by definition, and therefore the point where average cost is a minimum is the point where average cost is equal to marginal cost.

Similarly, the minimum point of the average variable cost curve, $\frac{V}{q}$, is found by setting the following derivative equal to zero:

$$\begin{aligned} \frac{d}{dq}\left(\frac{V}{q}\right) &= -\frac{V}{q^2} + \frac{1}{q}\frac{dV}{dq} \\ \frac{V}{q^2} &= \frac{1}{q}\frac{dV}{dq} \end{aligned}$$

Again multiplying through by q ,

$$\frac{V}{q} = \frac{dV}{dq} \quad \text{or} \quad \frac{V}{q} = \frac{dT}{dq},$$

because $\frac{dV}{dq} = \frac{dT}{dq}$ as $T = V + O$, where O is a constant.

Since $\frac{dT}{dq}$ is equal to marginal cost by definition, the minimum point on the average variable cost curve is that point where average variable cost equals marginal cost.

Needless to say, the point where $\frac{V}{q} = \frac{dT}{dq}$ is not the same point on the marginal cost curve as the point where $\frac{T}{q} = \frac{dT}{dq}$. (See Figure 6, on page 104.)

CHAPTER VI

Current Price Adjustment: Competitive Conditions

THE PROBLEM AND THE ASSUMPTIONS

CURRENT VERSUS LONGER PERIOD ADJUSTMENT OF DEMAND, SUPPLY, AND PRICE

THE three preceding chapters dealt with the general character of the exchange process and the setting within which it occurs. They also described, in some detail, the conditions that affect the demand for particular commodities, and outlined certain relationships between costs of production and output that are essential to an understanding of the supply side of the exchange mechanism.

The present chapter and the one following will be concerned with the more detailed examination of the operation of conditions that influence the current, or day-to-day, adjustment of prices and volume of pur-

chases and sales of particular goods. Subsequent chapters will consider the adjustments occurring, in response to changing economic conditions, over periods of time sufficiently long to permit substantial modifications in economic activity.

IMPORTANCE OF ACTIONS OF INDIVIDUAL PRODUCERS

In view of the great variety of conditions under which the production and sale of different commodities may take place, it is desirable to start with the conditions influencing the policy of individual firms in the matter of output, sales, and price. A firm is said to be "in equilibrium" when it has so adjusted its output, offerings for sale, and price, that it could, under current conditions, make no change that would improve its position.

A study of the circumstances under which an individual firm is in equilibrium helps to clarify the conditions necessary for the existence of group equilibrium in a market or within a given market. A full understanding of market "equilibrium" in the broader sense, however, requires that the relationships existing among rival producers and sellers also be examined, in order to determine the conditions prerequisite to stability in prices and production.

GENERAL ASSUMPTIONS

Each Firm Produces a Single Type of Product. For the sake of simplicity of analysis it is assumed, here and in the following chapters, that an individual firm pro-

duces only a single type of product. Firms with a multiplicity of products can be considered as divided into a number of units, each of which is specialized in a particular line. Thus, a large corporation such as General Motors would, for present purposes, be considered as embodying as many different "firms" as it has separate products.

Each Firm Endeavors to Maximize Net Revenue. Another important assumption involved in this analysis is that each firm endeavors to maximize its net revenue from the sale of its products. That is, each firm endeavors to arrive at the volume of output and sales that will yield the largest possible excess of total revenue over total cost of production. This obviously requires a consideration of both the nature of the demand for the product of the firm, and the costs of production that would be incurred in producing larger or smaller quantities of product. This is true whether the individual firm enjoys a full monopoly of the product that it sells, or is only one of a large number of rival producers of a standardized commodity.

It should be noted, however, that this objective (of maximizing the net returns to the individual firm) can be viewed in different ways. The management of a firm may, on the one hand, concentrate attention on the immediate situation, and endeavor in every way possible to maximize immediate or current net revenue, under the conditions prevailing at the moment. It may, on the other hand, formulate its policies with respect to output, prices, and sales with a view to maximizing net revenue over a long period of time. To do the latter

may, at times, require the adoption of a course of action that will not, for one reason or another, yield maximized net returns in the present or very immediate future.

SUPPLY AND PRICE ADJUSTMENTS UNDER PURE COMPETITION

RELATION OF THE INDIVIDUAL FIRM TO THE MARKET

Absence of Effective Control over Price. Two fundamental conditions necessary for the existence of pure competition in the exchange of goods or services have already been described; namely, that there shall be a large number of rival sellers present in the market, and that their respective wares shall be freely substitutable. This condition is fully met only where the commodities offered for sale are standardized and homogeneous. Other conditions necessary for the existence of pure competition are related to these two. Full information among both buyers and sellers as to demand and supply conditions in the market is essential if freedom of substitution is to prevail. The absence of any coercion or other influences impairing the freedom of individual buyers and sellers to enter or retire from the market, or to trade with whomsoever each one may desire, is also an essential condition for freedom of substitution. When the number of buyers and sellers is large, the effect of any action that might be taken by a single buyer or seller alone would, at least in his

opinion, have little effect upon the entire quantity demanded or offered for sale, and hence would have comparatively little effect upon the price.

Under such circumstances, the individual producer is unable to exert any direct influence upon the price prevailing in the market; he is compelled to take the level of price as a condition beyond his own control. His activities, therefore, will be directed chiefly to the adjustment of his own production and sales in such a way as to obtain the largest possible net revenue in view of the prevailing, or expected future, price.

Marginal Cost and the Output of the Individual Firm. It is a general rule that the individual firm will obtain the largest possible net revenue (or hold its loss to a minimum) if it adjusts its output to the point at which marginal cost is just equal to marginal revenue. A moment's reflection will show that this must be so, because, by definition, the marginal revenue represents the increase in total revenue resulting from a given increase in the number of units sold; while marginal cost represents the increase in total cost resulting from a given increase in the number of units produced for sale. If output and sales are less in amount than the quantity at which marginal revenue equals marginal cost, the added revenue that could be obtained by increasing output by a few units would exceed the added cost of the additional output. If output and sales, on the other hand, exceed the point where marginal cost equals marginal revenue, the cost of the excess output would exceed the revenue obtainable from it. From the viewpoint of the individual firm, therefore, the point

of equilibrium is the point at which marginal revenue equals marginal cost.

Graphic Illustration. The situation of the individual firm under conditions of pure competition is illustrated graphically in Figure 7 on page 120. Under purely competitive conditions, as pointed out in the chapter on demand, the marginal revenue curve, MR , for the particular firm, is identical with the average revenue curve, AR , and the level of this marginal-average curve corresponds with the prevailing price. In the example illustrated in Figure 7, the individual firm's marginal-average curve is represented by the horizontal line drawn through the price of \$4.00. It follows, therefore, that under pure competition the individual firm would find it advantageous to expand output up to the point at which marginal cost, marginal revenue, average revenue, and price are equal. In the illustration, this output would be ten thousand units. Less than this output would afford less than the largest possible revenue under current conditions; more than this output would involve a loss.

If the price were to rise, it would be advantageous for the firm to expand output. For example, a rise in price from \$4.00 to \$5.00, represented in Figure 7 by the line AR' , MR' , would make it advantageous for this firm to increase output from ten thousand units to thirteen thousand units. For every increase in output beyond ten thousand units, marginal revenue would exceed marginal cost until an output of thirteen thousand units was reached. At that output, marginal revenue would equal marginal cost, and beyond that

output, marginal cost would exceed marginal revenue, resulting in a loss.

If, on the other hand, the price were to decline to \$3.00, represented by the lower line, AR'' , MR'' , in

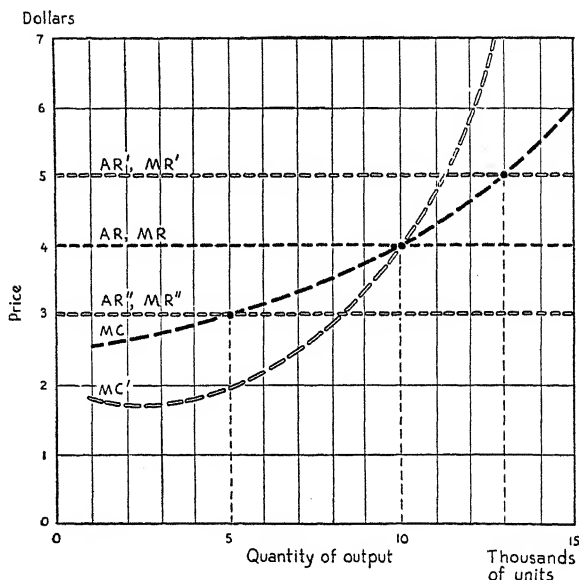


FIGURE 7. ADJUSTMENT OF OUTPUT OF THE INDIVIDUAL FIRM UNDER CONDITIONS OF PURE COMPETITION

Figure 7, it would be necessary for the firm to reduce output to five thousand units. For any output greater than that, marginal cost would exceed marginal revenue, resulting in a loss.

The Short-Period Supply Curve of the Individual Firm. Thus, under conditions of pure competition, the

current, or short-period, supply curve of the individual firm is the same as its marginal cost curve. The short-period supply curve of the individual firm indicates the amounts that it would offer for sale at different prices, within a period of time long enough to permit changes in the amount of labor, supplies, and materials worked up into final products, but not long enough to permit elaborate adjustments in plant and facilities of production.

The total market supply in the short period, under conditions of pure competition, consists of the summation of the supply schedules of the individual firms.

Effect of Elasticity of Supply of the Individual Firm. Elasticity or inelasticity of the short-period supply of an individual firm is determined by the relative steepness of its marginal cost curve.¹ In Figure 7, the marginal cost curve, MC' , is inelastic, as compared with the marginal cost curve, MC , which is elastic. It is apparent from an examination of the figure that if the marginal cost curve were extremely inelastic over a certain range of prices, the price might rise or fall very considerably without inducing a substantial change in the volume of output. With an inelastic marginal cost curve like MC' , a rise in price to \$5.00 would enable an increase in output to scarcely eleven thousand units, whereas, with a marginal cost curve like MC , output would be increased to thirteen thousand units.

¹The term "elasticity of supply" is parallel to the term "elasticity of demand", discussed in Chapter IV. If the effect of an increase in price would be a directly proportionate increase in quantity offered for sale, supply would have an elasticity of *unity*. If an increase in price would result in a more than proportionate increase in quantity offered for sale, supply is relatively elastic; if the opposite is true, supply is inelastic.

Similarly, with a decline in price to \$3.00, an individual firm with a marginal cost curve like MC' would only curtail output to about eight thousand units; whereas an individual firm with an elastic marginal cost curve like MC would find it necessary to reduce output to five thousand units. When the marginal cost curve is relatively elastic, therefore, a comparatively small variation in the price might produce severe changes in the volume of output.

Restricted Significance of Average Cost in the Short Period. It will be noted that this discussion of adjustment of output to maximize the net revenue of the individual firm has confined attention to the marginal cost of production, without referring to the situation with respect to average cost. This follows from the fact that, within any short period of time, the overhead cost represents claims, for the use of plant, facilities, and certain types of services, that have already been "sunk" in the business and cannot be recovered. As a consequence, no change in output would affect these elements in costs. The output, therefore, that will yield the largest net return over and above total *variable* cost will likewise afford the largest possible return over and above total cost (both fixed and variable). Or, if loss is being incurred, such an output will most nearly meet total cost.

In the short period, the price per unit, or average revenue received, may be either greater or less than the average cost. The actual output that can most advantageously be produced will be that at which marginal cost equals marginal revenue. In the short

period, average cost is of purely historical interest. The degree of correspondence between average cost and selling price indicates the extent to which current results are fulfilling the expectations on which undertakings were made in the past. A comparison of current and expected future prices with average cost may, of course, influence present decisions with respect to the future.²

TENDENCIES TOWARD GENERAL MARKET EQUILIBRIUM

Thus far, the problem of current price adjustment under conditions of pure competition has been considered from the standpoint of the individual firm, to which the prevailing price appears, practically, as a given fact to which it must adjust itself. The next step in the analysis of supply is to consider how various individual selling firms, in seeking the most advantageous adjustments for themselves, tend to produce an adjustment of the total amount offered for sale in the market to the total amount demanded. It is necessary, in other words, to consider the tendencies toward equilibrium in the market as a whole. The word "tendency" is used here to indicate that, although movements toward equilibrium are always in progress, changing conditions from day to day are likely to prevent such movements from ever reaching the point where no one, either on the buying side or the selling side, can make a change that is advantageous to himself.

The nature of the adjustments tending toward gen-

² See below, Chapter IX.

eral market equilibrium may be traced graphically in Figure 8. Here the relationships between the individual firm and the general market situation are indicated by showing the demand and supply curves for the market as a whole at the right-hand side of the diagram, and, at the left side, the supply curve of the individual firm, based on the marginal cost curve of the firm. This individual supply curve is simply a small-scale replica of the marginal cost curve shown in Figure 7 on page 120. The quantity scale (base line) is broken to call attention to the fact that the left-hand section, illustrating the situation of the individual firm, constitutes only a small fragment of the total supply and demand situation portrayed at the right. This is also indicated by the size of the quantity figures on the scale.

A glance at the right-hand portion of Figure 8, representing the market as a whole, shows that at a price of \$1.00 the aggregate supply and aggregate demand will be equal, the quantity marketed being a million units. Unless general conditions were to change, this is the *only* price that would give market equilibrium. If, for example, the price were less than \$1.00, say 75 cents, there would be a demand for a million and a half units, but only a half-million units would be offered. Many buyers, unable to obtain any of the product at 75 cents, and willing to pay more, would bid higher prices rather than go without. This competitive bidding would continue until the price had again reached the equilibrium level of \$1.00, at which the quantity offered would just equal the quantity

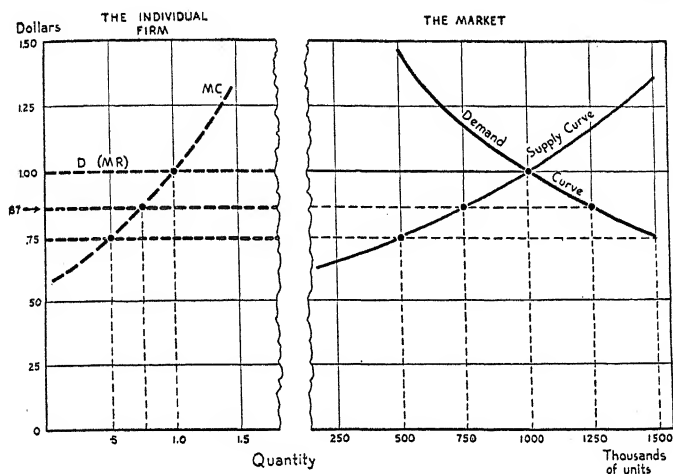


FIGURE 8. RELATIONSHIP BETWEEN THE SUPPLY OF THE INDIVIDUAL PRODUCER AND THE TOTAL MARKET DEMAND, SUPPLY, AND PRICE

demand. If the price were above \$1.00 the competitive bidding of the sellers (who, at a price in excess of \$1.00, would be willing to sell more than a million units in the aggregate) would force the price down to the equilibrium level of \$1.00.

The left side of Figure 8 portrays the demand and supply situation in terms of a typical individual firm, assuming that the number of producers is large (say one thousand) and that the business is fairly evenly distributed among them. Each individual firm will look upon the demand for its own output as indefinitely large, indicated by the horizontal line, *MR*, which also represents marginal revenue to the firm. Even the

greatest possible expansion by this particular producer could not (within any short time, and in the absence of similar action by others) increase the total quantity offered for sale sufficiently to depress the market price by more than a negligible amount.

The supply curve, MC , of the individual firm indicates the varying quantities that this producer could produce, at different prices, with marginal cost equal to price. Other producers' individual supply curves would differ if their situations with respect to variable cost were dissimilar. All of these individual situations of the thousand producers are blended in the composite, or market, supply curve shown in the right-hand portion of the figure. The latter curve shows the total amounts that would be offered, at different prices, by all of the producers taken together; it is really a summation of their respective marginal cost curves.

Although the demand is highly elastic as it appears to the individual producer, the aggregate or *market* demand curve is not, as indicated in Figure 8. Moreover, while the effect upon total supply of the action of any individual producer is infinitesimal, if all concertedly undertake to expand or contract output and sales, the total effect may be very great.

For example, a twenty-five per cent increase by a single producer would increase the total market supply by only a few hundred units at most. This would have a very slight effect on the total supply, and an infinitesimal effect on price. Suppose, however, that for some reason all of the producers were to increase their output by twenty-five per cent, the effect would be to

reduce the price by an appreciable amount. According to the situation illustrated by Figure 8, such an increase in supply would result in a price decline to 87 cents. At a price of 87 cents, however, each individual firm would presumably reduce its output and sales once more. The single firm illustrated in Figure 8 would, for example, be inclined to reduce output from a thousand to seven hundred and fifty units. Similar action by all the firms would, in turn, reduce the amount offered for sale from a million to seven hundred and fifty thousand units. Equilibrium would be reached once more when marginal costs of individual firms were equal to marginal revenues and to price.

The forces tending, over a period of time, to induce changes in the adjustments of demand, supply, and price, as a consequence of individual decisions of a cumulative or dynamic sort, will be considered in Chapter VIII. Chapter VII, meanwhile, will be devoted to the description of the short-period supply situations under conditions of monopoly or monopolistic competition.

CHAPTER VII

Current Price Adjustment: Monopolistic Conditions

SUPPLY AND PRICE ADJUSTMENTS UNDER MONOPOLY

POSITION OF THE MONOPOLISTIC FIRM

The Significance of the Demand Situation. As already indicated in the discussion in Chapter III, the characteristic feature of a pure monopoly is the absence of any ready substitute for the commodity of which the monopolist is the sole seller. This does not mean that a commodity, to be monopolized, must be indispensable, or that customers in general must buy it, regardless of price. It simply means that consumers must choose, in making their purchases, between the monopolized article and the wide range of other goods and services appealing to their choice. They cannot, however, satisfy the desires that the monopolized commodity would serve by choosing some

other article closely resembling it; there are no such immediate substitutes.

Under such circumstances, the increase or decrease in the purchases of the monopolized good, that would result if its price were lowered or raised, would affect only in slight degree the purchases of any particular one of a large number of other unlike goods. Thus, a change in the price of the monopolized good would be unlikely to provoke offsetting price changes by the producers of other goods. If the monopolist lowered his price, no one else would cut; if he raised his price, no one else could come in to take business away from him. This is what is meant by the statement that under pure monopoly the demand for the product is independent of the price, although, of course, the quantity taken would be less at a higher price than at a lower price. Changes in the price of the monopolized good will not induce shifts in the supply of other goods sufficient to affect the demand curve for the monopolized product.

Control of Price. The ability of the seller of a particular commodity to fix the price at which it is sold may also be regarded as an indication of the existence of a monopolistic element in the marketing of any commodity, although this control may be nominal rather than real. In the sale of most commodities today, the seller names the price at which he is prepared to sell. The buyers may purchase at that price if they like, or may look elsewhere. If the seller finds that he is unable to dispose of a sufficient quantity of his product at the price he has quoted, he may reduce

his quotation. If he feels that he would still be able to sell a satisfactory quantity at a higher price, he may advance his quoted price.

The chief difference between the situation of pure competition and one of monopoly is that, under competition, a seller, if he wishes to dispose of his product, cannot quote a price significantly higher than that prevailing in the market.¹ Nor will a competitor quote a price significantly below the prevailing market price, because it is not necessary to do so. In other words, under pure competition the individual producer possesses no power to fix the price of his own product. If he demands a higher price for his goods than prevails in the market, he will eliminate himself from the exchange.

Under pure monopoly, on the other hand, there is no market supply apart from that provided by the monopolist. Assuming that the demand for his product is truly independent of the price that is fixed, the monopolist will name, and maintain, the price that, under the prevailing demand conditions, will be most advantageous to himself. No matter what price he may fix, there will be no tendency for that price to induce a shift in the demand for his product.² Thus, pure monopoly represents an extreme degree of control over price, just as pure competition represents the op-

¹ Unless all of his rivals are already selling up to their full capacity, and a demand for additional quantities is still in evidence.

² The independence of the demand for the monopolized product and the control that the monopolist enjoys over price does not mean that the demand for the monopolized product is necessarily inelastic. It simply implies that the price policy of the monopolist will not cause shifting of demand.

posite extreme of absence of control over price. In actual life the degree of control over price possessed by the producers of particular commodities is likely to fall somewhere between the extreme of pure competition and the extreme of pure monopoly.

CONDITIONS OF CURRENT PRICE

EQUILIBRIUM UNDER PURE MONOPOLY

The analysis of the current adjustment of demand, supply, and price, under conditions of pure monopoly, does not need to go beyond a consideration of the price policy of the single monopolistic firm. Here, as under conditions of pure competition, the individual producer is endeavoring to maximize his net revenue. The situation is simpler than under conditions of pure competition, because there is just one firm to be considered. Once the monopolist has discovered the adjustment of price, demand, and supply that will maximize his net returns, market equilibrium is attained. Barring changes either in demand or in variable cost, the monopolist may maintain the price he has fixed as long as he wishes.

The maximum current net revenue will be obtained when the monopolist's volume of sales is such that marginal cost is just equal to marginal revenue. Under conditions of pure monopoly, however, the demand curve for the product of the monopolist (his average revenue curve) is not completely elastic; instead, it declines as quantity offered increases. As a consequence, a given increase in the volume of sales will not bring in a proportionate increase in total revenue from sales.

It may, in fact, lead to a diminution in total revenue.³ In other words, the marginal revenue obtainable from an increase in the volume of sales will be less than the average revenue.⁴ (See *MR* curves in Figures 9 and 10 on pages 133 and 135.) Therefore, the monopolist will attain his maximum advantage by producing up to the point at which marginal cost equals marginal revenue.

SCHEDULE ILLUSTRATING THE RELATIONSHIPS BETWEEN DEMAND, SUPPLY, AND PRICE UNDER MONOPOLISTIC CONDITIONS

(Period of time assumed to be one week)

QUANTITY DEMANDED [ALSO OUTPUT]	PRICE [ALSO AVERAGE REVENUE]	MARGINAL REVENUE	MARGINAL COST	AVERAGE VARIABLE COST	TOTAL REVENUE (1) × (2)	TOTAL VARIABLE COST	COLUMN (6) MINUS COLUMN (7)	NET REVENUE, AL- LOWING \$100 FOR OVERHEAD COST
(1)	AR (2)	MR (3)	MC (4)	AVC (5)	TR (6)	TVC (7)	(8)	(9)
(Units)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)
100	7.10	5.80	1.80	2.10	710	210	500	100
200	5.90	3.70	1.70	1.90	1180	380	800	400
250	5.38	2.88	(1.88 = 1.88)		1345	470	875	475
300	4.90	(2.20 = 2.20)	1.90	1.90	1470	570	900	500
400	4.10	1.30	3.30	2.10	1640	840	800	400
500	3.50	1.00	5.00	2.50	1750	1250	500	100

³ See above, pp. 75-80, for full discussion of the relation between average revenue, total revenue, and marginal revenue for the individual firm.

⁴ A declining average revenue curve will be accompanied by either a falling marginal revenue curve or a rising marginal revenue curve, depending upon the elasticity of the average revenue curve. If the average revenue curve is relatively inelastic, marginal revenue will decline with increased sales; if relatively elastic, marginal revenue will rise. Marginal revenue will not exceed average revenue at any point.

The situation under pure monopoly is illustrated diagrammatically in Figure 9 below and in the table on page 132. It will be noted that the rising marginal

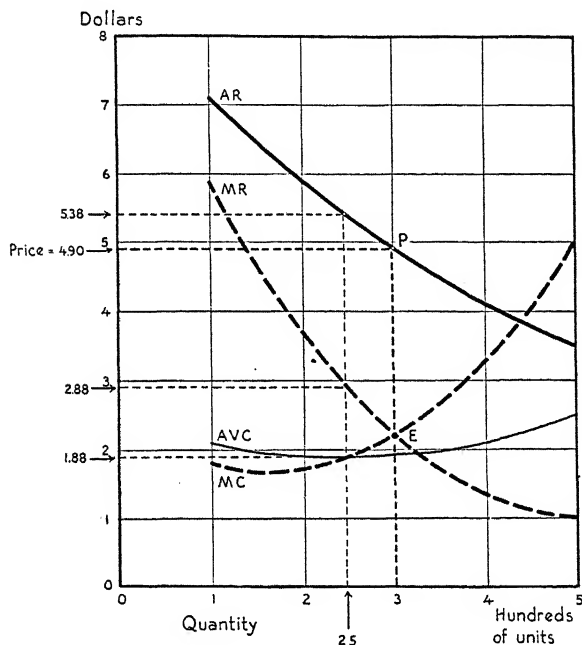


FIGURE 9. THE RELATIONSHIPS BETWEEN DEMAND, SUPPLY, AND PRICE UNDER MONOPOLISTIC CONDITIONS

cost curve, *MC*, cuts the declining marginal revenue curve, *MR*, at point *E*. At this point, corresponding with an output of three hundred units, marginal revenue equals marginal cost, \$2.20. If less than this quantity of output were produced and sold, as for example, two hundred and fifty units, the marginal revenue, \$2.88, would exceed the marginal

cost, \$1.88, at that output. In other words, selling additional units beyond two hundred and fifty adds more to revenue than it adds to cost, up to an output of three hundred. Beyond three hundred units, added cost would exceed added revenue. This is clear from the fact that for an output less than three hundred, the *MC* curve is below the *MR* curve, whereas for larger outputs it is above. This is also shown by the data in columns 3 and 4 of the table on page 132.

With an output of three hundred units, the average revenue would be \$4.90, and the total revenue would be \$1,470 (that is, $\$4.90 \times 300$). The excess of total revenue over total variable cost would be \$900, since total variable cost would be \$570 (that is, $\$1.90 \times 300$). If overhead cost were \$400, the net revenue would be \$500, as is shown in the last column of the table.⁵

It should be noted that in dealing with *current* price adjustment under monopolistic conditions, as well as under conditions of pure competition, the point of maximized net returns is independent of *average* cost. The reasons for this have already been set forth in Chapter VI, and need not be repeated here.⁶

Effect of Elasticity of Demand on Monopoly Price. Figure 10 on page 135 and the schedule on page 136 illustrate a situation where the demand for the product ultimately becomes very elastic. This is reflected in the fact that, below a price of \$6.64 per unit, the marginal

⁵ Note that the excess of total revenue over variable cost can be obtained directly, for any output, by subtracting the average variable cost from the average revenue, and multiplying the difference by the number of units of output. For example, $(\$4.90 - \$1.90) \times 300 = \$3.00 \times 300 = \900 .

⁶ See above, pp. 122-123.

revenue curve rises, and approaches the average revenue curve. At the point marked *L* in Figure 10, marginal revenue ceases to decline and thereafter rises with in-

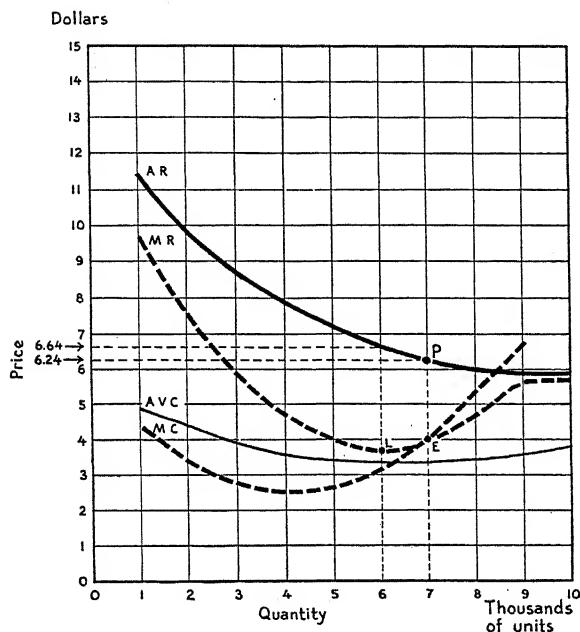


FIGURE 10. RELATIONSHIPS BETWEEN DEMAND, SUPPLY, AND PRICE UNDER MONOPOLISTIC CONDITIONS
(Effect of Elastic Demand)

creased output. At the point *L*, the output would be six thousand units and the price \$6.64. The marginal cost curve, however, rises more rapidly beyond an output of six thousand, and overtakes rising marginal revenue at an output of seven thousand. For outputs

beyond that, marginal cost is greater than marginal revenue, in spite of the fact that the latter is rising.

In this illustration quantity demanded for outputs beyond nine thousand units would have practically

SCHEDULE ILLUSTRATING THE RELATIONSHIPS BETWEEN
DEMAND, SUPPLY, AND PRICE UNDER MONOPOLISTIC
CONDITIONS

EFFECT OF ELASTIC DEMAND

(Period of time assumed to be one week)

QUANTITY DEMANDED [ALSO OUTPUT]	PRICE [ALSO AVERAGE REVENUE]	MARGINAL REVENUE	MARGINAL COST	AVERAGE VARIABLE COST	TOTAL REVENUE (1) × (2)	TOTAL VARIABLE COST (1) × (5)	COLUMN (6) MINUS COLUMN (7)	NET REVENUE AL- LOWING \$10,000 FOR OVERHEAD
(1)	AR (2)	MR (3)	MC (4)	AVC (5)	TR (6)	TVC (7)	(8)	(9)
(Units)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)
1,000	11.04	9.76	4.36	4.99	11,040	4,990	6,050	-3,950
2,000	9.84	7.60	3.40	4.42	19,680	8,840	10,840	840
3,000	8.80	5.92	2.80	3.97	26,400	11,910	14,490	4,490
4,000	7.92	4.72	2.56	3.64	31,680	14,560	17,120	7,120
5,000	7.20	4.00	2.68	3.43	36,000	17,150	18,850	8,850
6,000	6.64	3.76	3.16	3.34	39,840	20,040	19,800	9,800
7,000	6.24	4.00 = 4.00	3.37	3.37	43,680	23,590	20,090	10,090
8,000	6.00	4.72	3.52	3.52	48,000	28,160	19,840	9,840
9,000	5.92	5.92	3.79	3.79	53,280	34,110	19,170	9,170

the same appearance to the monopolist as the demand for its own output normally has to the individual firm under pure competition. Nevertheless, with cost conditions as indicated, the monopolist would find his greatest advantage in producing an output of seven

thousand units, because at larger outputs his marginal cost would exceed marginal revenue. This is indicated by the fact that the MC curve is above the MR curve for all outputs greater than seven thousand.

It should be noted, further, that equilibrium for the monopoly is attained without satisfying the further condition that is met under pure competition; namely, that price, marginal cost, marginal revenue, and average revenue shall all be equal. This fourfold equality can exist only where marginal revenue and average revenue are equal; that is, when the demand curve for the individual producer's product is completely elastic, appearing to him as a horizontal line.

Under monopolistic conditions, the demand curve for the individual firm's product is sloped, and marginal and average revenues diverge. The point of equilibrium for the monopolist (illustrated in Figures 9 and 10, and the schedules on pages 133 and 135), will be reached when marginal cost equals marginal revenue. At that point (indicated by the letter E in the figures) marginal cost will be less than average revenue or price.

CURRENT SUPPLY AND PRICE AD- JUSTMENT UNDER DUOPOLY AND OLIGOPOLY

An intermediate situation, between pure monopoly and monopolistic competition, exists when a small number of rival firms is engaged in the production and

sale of a commodity so standardized that branding means nothing to the buyers. If the sellers were so situated that there was no reason (such as convenience of service and difference in delivery costs) for customers to prefer one seller to another, what level of price would tend to prevail? The situation resembles that of pure competition to the extent that free substitutability of product exists, but it differs from pure competition because the number of sellers is small, rather than large. Where there are only two sellers, the term "duopoly" is applied. The term "oligopoly" is employed to describe the situation if there are more than two, but not many, sellers.

The characteristic feature of duopoly or oligopoly is that no single position of market equilibrium in the adjustment of current demand, supply, and price can be clearly identified or assumed to exist. The actual adjustment of demand, supply, and price, prevailing at any time under duopoly or oligopoly, will depend upon the way in which different producers react to the conditions they find prevailing in the market. This will become evident in the course of the following discussion. Inasmuch as free substitutability of product among the different sellers is assumed by definition, it will be impossible for the rival producers to charge different prices (at the same time) for their respective products.⁷ Since the nature of the adjustment under oligopoly is similar in every essential detail to that under duopoly, the simpler case of duopoly will be analyzed.

Suppose, for example, that the market demand

⁷ Unless all of the producers but one are producing at full capacity.

schedule for a product is represented by the curve *AR* in Figure 11 on page 140 and the first two columns of the following table:

RELATIONSHIP BETWEEN DEMAND, SUPPLY, AND PRICE

As It Would Appear If One Firm Had a Monopoly

QUANTITY DEMANDED [ALSO OUTPUT]	PRICE [ALSO AVERAGE REVENUE]	MARGINAL REVENUE	AVERAGE VARIABLE COST [ALSO MARGINAL COST]	TOTAL REVENUE	TOTAL VARIABLE COST	EXCESS (5)-(6)
(1)	AR (2)	MR (3)	AVC, MC (4)	TR (5)	TVC (6)	(7)
(Thousands of Units)	(Dollars)	(Dollars)	(Dollars)	(Thousands of Dollars)		
10	11	10	2	110	20	90
20	10	8	2	200	40	160
30	9	6	2	270	60	210
40	8	4	2	320	80	240
50	7	2	2	350	100	250
60	6	0	2	360	120	240
70	5	- 2	2	350	140	210

If there were only one producer, with a demand (average revenue) curve as indicated above, his marginal revenue would be as shown by the *MR* curve in Figure 11, or by column 3 in the above table. Suppose, however, that there were two producers located side by side, serving the common market, and that each firm had a maximum capacity of fifty thousand units per year, and that average variable cost of production was \$2.00 per unit of output for each of the firms. It follows that the marginal cost of each firm, up to full capacity, would be the same as average variable cost. Both average variable cost and marginal cost would be represented by the horizontal line *AVC, MC*, shown in Figure 11.

If there were one firm, instead of two, in the industry, the demand, supply, and price adjustment would be in equilibrium at the price of \$7.00, with a

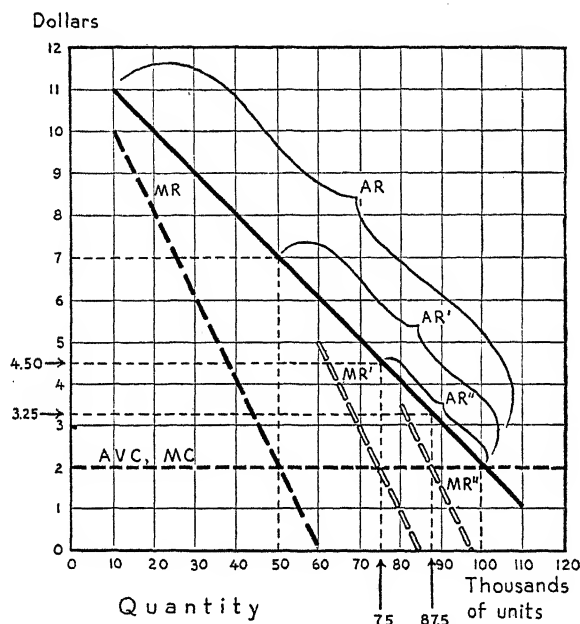


FIGURE II. RELATIONSHIP BETWEEN DEMAND, SUPPLY, AND PRICE UNDER DUOPOLY

total output of fifty thousand units, equal to the full capacity of the firm.⁸ In the figure this point of pure monopoly equilibrium is indicated by the intersection of the marginal revenue and marginal cost curves, *MC* and *MR*.

⁸ A glance at the table shows that this output and price would yield the maximum net revenue above variable cost.

The presence of a second firm in the industry would change the situation materially from that prevailing under pure monopoly. Suppose that Firm A, the first one in the field, had been selling fifty thousand units—the quantity that, under existing conditions of demand and cost, would give it the maximum total net revenue. Any increase in the total quantity offered in the market would result in a decline in the average price that could be obtained.

If the second firm, B, proceeded on the assumption that Firm A would continue to produce and sell fifty thousand units, the demand curve for Firm B's product would consist of that part of the market demand curve lying beyond fifty thousand units. The following table shows this demand situation, as it would be seen by Firm B, together with the marginal revenue that could be derived from varying quantities of sales:

DEMAND SITUATION AS IT WOULD APPEAR TO THE SECOND FIRM

(Assuming the first firm was operating to capacity)

QUANTITY DEMANDED [ALSO OUTPUT]	PRICE [ALSO AVERAGE REVENUE]	MARGINAL REVENUE	AVERAGE VARIABLE COST [ALSO MARGINAL COST]	TOTAL REVENUE	TOTAL VARIABLE COST	EXCESS (5)-(6)
(1)	AR' (2)	MR' (3)	AVC, MC (4)	TR (5)	TVC (6)	(7)
(Thousands of Units)	(Dollars)	(Dollars)	(Dollars)	(Thousands of Dollars)		
10	6.00	5.00	2.00	60	20	40
20	5.00	3.00	2.00	100	40	60
25	4.50	2.00	2.00	112.5	50	62.5
30	4.00	1.00	2.00	120	60	60
35	3.50	0.00	2.00	122.5	70	52.5

The marginal revenue obtainable is also shown graphically by the MR' curve in Figure 11. Firm B could maximize its receipts by producing and selling twenty-five thousand units, as is indicated in the table. This is shown graphically in Figure 11 by the intersection of the marginal cost curve, MC , and the marginal revenue curve, MR' , of Firm B. However, the price of each of the seventy-five thousand units now sold, including those sold by Firm A as well as those sold by Firm B, would be \$4.50, instead of \$7.00.

This adjustment between current demand, supply, and price, would not, however, bring about equilibrium. Firm B could profitably increase its output beyond twenty-five thousand units at the price of \$4.50, provided that the increase in sales was accomplished by diverting customers from Firm A.⁹ Indeed, it may be reasonably supposed that while Firm B was undercutting the price of \$7.00 formerly enjoyed by Firm A, part of the customers formerly buying from A would shift to B. Thus when the output of both firms taken together was seventy-five thousand units, Firm A might be selling half and Firm B the remaining half. Either one of the firms could advantageously cut its price by a small amount, because by so doing it could take sufficient sales from the other to reach its full capacity of fifty thousand units. The demand for its own output, at a price slightly below that charged by the other firm, would appear, within reasonable limits, to either of the two firms, to be completely elastic. When both firms

⁹ If Firm B sold more, and Firm A continued to sell as much as before, the price would decline.

together were producing and selling seventy-five thousand units, the remainder of the market demand would appear to each of them to be as represented in the following schedule:

DEMAND SITUATION AS IT WOULD APPEAR TO EITHER
FIRM

WITH RESPECT TO ANY REMAINING DEMAND AT A PRICE HIGHER THAN
AVERAGE VARIABLE COST

(Assuming the Two Firms Together Are Selling Seventy-Five Thousand
Units)

QUANTITY DEMANDED [ALSO OUTPUT]	PRICE [ALSO AVERAGE REVENUE]	MARGINAL REVENUE	AVERAGE VARIABLE COST [ALSO MARGINAL COST]	TOTAL REVENUE	TOTAL VARIABLE COST	EXCESS (5)-(6)
(1)	AR'' (2)	MR'' (3)	AVC, MC (4)	TR (5)	TVC (6)	(7)
(Thousands of Units)	(Dollars)	(Dollars)	(Dollars)	(Thousands of Dollars)		
5	4.00	3.50	2.00	20	10	10
10	3.50	2.50	2.00	35	20	15
12.5	3.25	2.00	2.00	40.625	25	15.625
15	3.00	1.50	2.00	45	30	15
20	2.50	.50	2.00	50	40	10

The situation as it would appear to either one is shown graphically in Figure 11 by the average revenue curve AR'' , and the marginal revenue curve MR'' . Suppose that, under these circumstances, Firm A continued to produce thirty-seven thousand five hundred units, but Firm B expanded to full capacity. The total output would be eighty-seven thousand five hundred units, and the price would be forced down to \$3.25. Firm A, still not operating to capacity, could then obtain

greater total revenue by cutting prices so as to take sales away from its rival.

Such a process of competition between the rival firms could continue until both had reached capacity output. Total output would then be one hundred thousand units, and the price \$2.00 per unit. With average variable and marginal costs of \$2.00, neither firm could afford to produce more than fifty thousand units, since a larger output than that would force the price below average variable cost.

Even this situation with respect to price and output would, however, be unstable, with but two firms competing. One of the firms, say Firm B, seeing that the other was producing to full capacity and therefore was unable to expand its sales any further, could obtain a larger net revenue by curtailing its sales from fifty thousand units to a smaller amount. Customers who could not be supplied by Firm A would have to buy from Firm B or go without. As long as Firm A was producing and selling fifty thousand units, Firm B could maximize its net revenue by raising its price to \$4.50 and selling twenty-five thousand units. But if Firm B did so, Firm A could once more improve its position by raising its price to \$4.50, since at that price seventy-five thousand units would be demanded. This, however, would bring conditions back virtually to the point at which the price war began, because Firm B could again begin to take business away from Firm A by undercutting the price. Thus, another price-cutting war would be initiated.

While there is no inherent element of stability in

any price under conditions of duopoly or oligopoly, it is probable, however, that the few competing firms would quickly realize the necessity for taking account of what the other firm would do in response to a given move. In such circumstances, the rival firms would come to some division of the market among them, or refrain from active price competition, with a policy of "live and let live." In this way, each would be able to obtain substantially larger net returns than could be obtained if they were to compete in the matter of price. This is, indeed, the most likely outcome in actual life, where the number of sellers is small, and is reflected in the sentiment frequently expressed that price competition should be avoided for fear of "spoiling the market." Such a division of the field might result from an independent decision on the part of each producer to restrict his own output and sales to some part of the whole market. It might also result from agreement between the two producers not to compete with each other in the matter of price. In the latter event, however, the situation would cease to be an example of duopoly, and would more properly be regarded as a case of monopoly.

What has been said of duopoly applies, in a more attenuated degree, to conditions when the rivals are more numerous but still few in number. There are probably considerable differences, from industry to industry, in the number of rival firms required to reduce to negligible proportions the influence of the action of any one firm. But whenever a situation prevails in which each of the rival firms does not need

to take account of the indirect effects of its own action, oligopoly gives way to competition.

CURRENT PRICE EQUILIBRIUM UNDER MONOPOLISTIC COMPETITION

THE SITUATION OF THE INDIVIDUAL FIRM

Interdependence of Demand Where Sellers Are Few.

A consideration of the conditions that characterize pure monopoly quickly leads to the conclusion that instances of pure monopoly are even rarer in actual life than are instances of pure competition.

Much more frequently the demand for the product of a single firm is related, sometimes in very complex ways, to the prices that are being charged for more or less similar products offered by rival concerns. From the standpoint of the firm producing a particular make of automobiles, radios, or hats, the sales of his own product will be affected in differing degrees by an increase or decrease in his price, depending upon whether or not his rivals make similar changes in their prices. In other words, where the products of several sellers may be substituted for each other more or less readily,¹⁰ the demand for any one of them is interdependent with the demands for the others. The prices of all of the substitutable products are interconnected in what has been described as a price or market structure.

¹⁰ Less readily than under pure competition; more readily than under monopoly conditions. See above, pp. 45-47.

Graphic Illustration of Interdependence. Presumably, if the producer of one brand fixes a high price relative to those fixed by the producers of other brands, he will lose some potential buyers whose preferences are not strongly established. On the other hand, if he fixes a low relative price, he may attract some additional buyers to his own brand. Thus, for the individual brand the relative price will have a profound influence on the volume of sales, this influence being clearly the greatest when the ease of substitution is greatest, and least where available substitutes are less convenient.

This situation is illustrated graphically in Figure 12, showing the change in demand that would occur under conditions of monopolistic competition if the individual producer changed his quoted price, relative to the prices of competing brands. Curve *AR* suggests the different quantities of a particular brand that would be demanded if the price of this brand were varied, without corresponding variations in the prices of rival

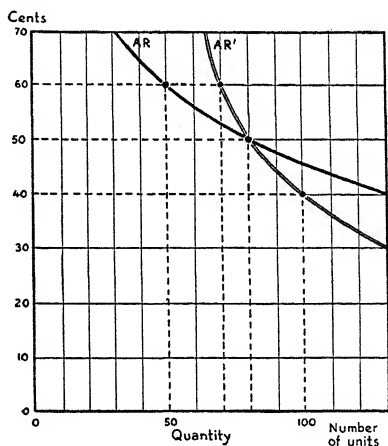


FIGURE 12. SHIFTING IN DEMAND INDUCED BY RELATIVE CHANGES IN PRICES UNDER CONDITIONS OF MONOPOLISTIC COMPETITION

brands. Curve AR' indicates the different quantities that would be taken at various prices for this brand, assuming that the prices of competing brands were readjusted simultaneously.

It will be noted that the curve AR is more elastic than the curve AR' . This means that if the prices of the other brands were not altered, a given reduction in the price of the brand in question would lead to a larger increase in the volume of sales than if other prices were changed, and vice versa. Thus, if the competing firms kept their prices at 50 cents, while one producer raised his price to 60 cents, his sales would fall off, not to seventy units, but to fifty units. On the other hand, if the one producer lowered his price to 40 cents, the prices quoted by his rivals remaining unchanged, his sales would increase to one hundred and thirty instead of one hundred units.

The Equilibrium of the Firm. So far as the individual firm is concerned, the conditions of equilibrium in the current adjustment of demand, supply, and price, are the same as those already outlined in the discussion of pure monopoly. The individual firm will obtain the largest possible net revenue over and above variable cost when it has discovered the volume of output and sales at which marginal revenue is equal to marginal cost. A change in output either upward or downward from that point, barring a change in other conditions, would reduce the excess of total revenue over total variable cost. It would therefore reduce the net return above total cost, or increase the deficit if losses were being incurred.

The situation under monopolistic competition differs from that existing under pure monopoly, however, in that the demand for the product of the individual firm (and its average revenue curve) will be affected by the actions of other producers in the group. In fixing his price, therefore, the producer of a particular branded or differentiated article will tend to consider the effect of his own price quotations on the actions of other producers of commodities substitutable for his own, as in the case of duopoly just described. Suppose, for example, that five different brands of a given commodity, produced by five different firms, cover the vast bulk of the sales. Suppose also that a ten per cent decrease in prices, if made simultaneously by all the producers, would result in a ten per cent increase in the sales of all the brands taken together, and vice versa. If this were true, a change of price, either upward or downward, if made by the entire group, would make little change in their respective revenues from sales.

If, however, one producer were to reduce his price ten per cent without price cuts being made by the rival producers, he would gain, not only the increased sales that would fall to his lot if all the sellers cut, but also part of the business ordinarily going to his competitors whose prices were not reduced. The change in his price relative to theirs would tend to produce a shift of customers to his brand. Thus, to the individual producer, the appearance of the demand curve for his product, under conditions of monopolistic competition, depends upon what he thinks will happen to his

market as a result of a price change. If he does not believe that his competitors will change their prices in response to a change in his price, the demand curve will seem more elastic than if he expects immediate offsetting price changes to occur.

Where the number of rivals is small, other producers seldom would long ignore a price cut made by one of their number, if it threatened to alter the demand situation adversely to themselves. Should they, in turn, reduce their prices, the incentive of buyers to substitute other brands would be removed, and the demand curve for each firm would tend to return to its previous proportions. In the end, the advantage derived by the firm making the initial cut would be canceled by the offsetting action of the other producers. The final result would probably be some expansion in the total volume of sales for the entire group, but at a lower price for each seller. Whether the individual firms would be better or worse off than before would depend, in part, upon the extent to which the temporary shifting of trade relationships had produced lasting alterations in consumer choices of products. It would also depend upon the effect that the changes in volume of sales might have upon the costs of the various firms.

CONDITIONS OF EQUILIBRIUM IN THE MARKET STRUCTURE

Tendencies toward Equilibrium. Under such circumstances as those described in the preceding section, the policy of each firm with respect to its volume of output, price, and sales, depends in substantial measure upon its estimate of the probable action of its rivals. It

is not possible to stop short in the analysis of current price adjustments with a statement of the conditions of equilibrium for the firm, where the substitution of rival products is possible, because the price and output of any single firm will not have reached full equilibrium until all of the rival firms are in equilibrium. That is, every one of the firms must have attained the level of output and prices that it regards as the best obtainable under the prevailing conditions. This amounts to saying that, in fact, full equilibrium in the market structure representing a given type of products is unlikely ever to be reached. Continuously changing conditions, or differing estimates as to the future on the part of those responsible for the destinies of rival firms, will always be obstructing or reversing the tendencies in progress.

In general, it may be said that the smaller the number of firms concerned (excepting pure monopoly) the less likely is it that equilibrium will be attained except through tacit agreement or general acceptance of a "live-and-let-live" policy. Under such circumstances, the problem of equilibrium under monopolistic competition resembles the problem of equilibrium under duopoly or oligopoly. With a large number of firms under monopolistic competition, the problem of equilibrium more nearly resembles that of equilibrium under pure competition. Under monopolistic competition, however, equilibrium must be conceived of as a state of balance among a large number of demand curves for the differentiated products. For no one of these products is the demand completely elastic; whereas, under pure competition, the demand curve for the prod-

uct of the individual firm appears to that firm to be completely elastic, even though the composite market demand for the product as a whole is not.

Graphic Illustration of Conditions of Equilibrium under Monopolistic Competition. The relationship between demand, supply, and price under monopolistic competition is illustrated by the tables on pages 152 and 154 and graphically by Figures 13a and 13b, on page 153.

If all of the competing firms were to vary their prices at the same time and in similar degree, the sales of the

RELATIONSHIPS BETWEEN DEMAND, SUPPLY, AND PRICE
OF THE DIFFERENTIATED PRODUCTS OF INDIVIDUAL
FIRMS UNDER MONOPOLISTIC COMPETITION

ASSUMING THAT THE PRICES OF ALL COMPETING FIRMS ARE CHANGED
CONCURRENTLY

(Period of time assumed to be one year)

QUANTITY DEMANDED [ALSO OUTPUT]	PRICE [ALSO AVERAGE REVENUE]	MARGINAL REVENUE	AVERAGE VARIABLE COST	MARGINAL COST	TOTAL REVENUE	TOTAL VARI- ABLE COST	REVENUE ABOVE VARI- ABLE COST
(1)	AR (2)	MR (3)	AVC (4)	MC (5)	TR (6)	TVC (7)	(8)
(Thousands of Units)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(In Thousands of Dollars)		
100	10.35	8.99	3.10	2.30	1,035	310	725
200	8.98	6.26	2.40	1.20	1,796	480	1,316
300	7.61	3.53	1.90	0.70	2,283	570	1,713
400	6.24	0.80	1.60	0.80	2,496	640	1,856
500	4.87	- 1.93	1.50	1.50	2,435	750	1,685
600	3.50	- 4.66	1.60	2.80	2,100	960	1,140
700	2.13	- 7.39	1.90	4.70	1,491	1,330	160
800	0.76	- 10.12	2.40	7.20	608	1,920	- 1,312

particular firm under consideration would be as represented by the average revenue curve, AR , in Figure 13a, or as shown in columns 1 and 2 of the above table. The

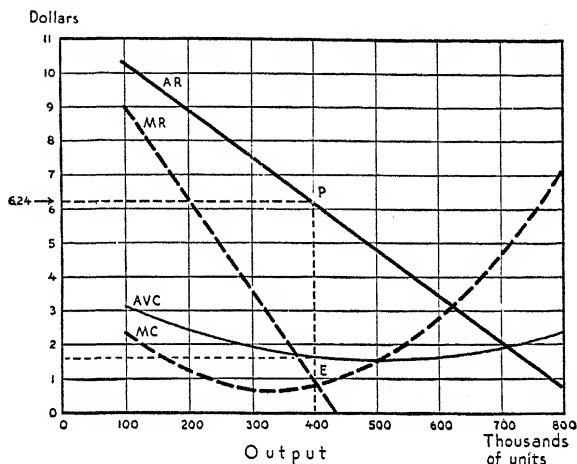


FIGURE 13a

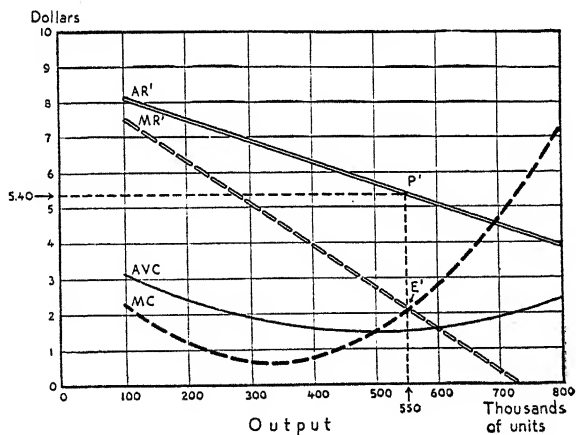


FIGURE 13b

most advantageous output under the assumed conditions would be four hundred thousand units, and the selling price would be \$6.24. (Note the intersection of the *MC* and *MR* curves at output of 400 thousand, the point marked *E* in Figure 13*a*.)

If, on the other hand, all the other competing firms were to maintain their prices unchanged, the demand for the product of this firm would vary in response to changes in its price as shown in Figure 13*b* and the following table:

RELATIONSHIPS BETWEEN DEMAND, SUPPLY, AND PRICE OF
THE DIFFERENTIATED PRODUCTS OF INDIVIDUAL FIRMS
UNDER MONOPOLISTIC COMPETITION

ASSUMING THAT ONE FIRM LOWERS ITS PRICE AND THE REMAINING FIRMS
MAINTAIN THEIR PRICES UNCHANGED

(Period of time assumed to be one year)

QUANTITY DEMANDED [ALSO OUTPUT]	PRICE [ALSO AVERAGE REVENUE]	MARGINAL REVENUE	AVERAGE VARIABLE COST	MARGINAL COST	TOTAL REVENUE	TOTAL VARI- ABLE COST	REVENUE ABOVE VARI- ABLE COST
(1)	AR' (2)	MR' (3)	AVC (4)	MC (5)	TR (6)	TVC (7)	(8)
(Thou- sands of Units)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(In Thousands of Dollars)		
100	8.10	7.50	3.10	2.30	810	310	500
200	7.50	6.30	2.40	1.20	1,500	480	1,020
300	6.90	5.10	1.90	0.70	2,070	570	1,500
400	6.30	3.90	1.60	0.80	2,520	640	1,680
500	5.70	2.70	1.50	1.50	2,850	750	2,100
550	5.40	2.10	1.53	2.10	2,970	842	2,128
600	5.10	1.50	1.60	2.80	3,060	960	2,100
700	4.50	0.30	1.90	4.70	3,150	1,530	1,620
800	3.90	- 0.90	2.40	7.20	3,120	1,920	1,200

In each case the marginal cost curve, MC , is the same, since it is assumed that the cost situation of the firm remains the same. Under the first set of assumptions, namely that the other firms would vary their prices, the marginal revenue and marginal cost of the individual firm would be equal at an output of four hundred thousand units. Under the second set of assumptions, marginal revenue and marginal cost would be equal at the larger output of five hundred and fifty thousand units; and net returns over and above total variable costs would be larger (\$2,128,000 as compared to \$1,856,000). This is shown in column 8 of the respective tables above, and is illustrated graphically by the area of the rectangles under the AR and AR' curves, respectively, minus the area of the rectangles under the AVC curves, respectively.

The selection of the volume of output and the price to be quoted depends upon the degree of probability that the rival firms would or would not meet a change in price made by the firm in question. Current price equilibrium would exist if each firm was satisfied with the returns it was getting, or feared that a change in its prices would precipitate price changes by its rivals, to its own disadvantage. With prices held constant, relative to each other, the volume of sales of each firm would be adjusted in accordance with the preferences of the customers, these of course being influenced by the relative prices. Such an equilibrium, if attained, might be very ephemeral, because it could be upset by the action of any one of the rival sellers.

What has just been said suggests once again the im-

portance of future expectations in accounting for economic behavior. This is especially clear in the case of monopolistic competition, where the individual firm may maintain a given price and sell a restricted volume of output, even though marginal revenue in excess of the marginal cost of additional output might be obtained by reducing the price. The price reduction is not inaugurated because of the repercussions on demand that it might produce. Marginal revenue actually realized from increased sales might be less than marginal cost, instead of greater, and the chance is not thought worth taking.

Production with Variable Costs in Excess of Current Average Revenues. Under certain circumstances production might be continued for short intervals, or even for extended periods, at a price so low that variable cost exceeded average revenue. In some instances, moreover, current outlays for variable costs might even exceed total current revenues. Such a situation might arise if a temporary withdrawal from the market, to prevent such a loss, would entail the loss of goodwill attaching to the trade name and render more difficult, if not impossible, the re-entry of the firm into the trade when conditions were more auspicious. Other instances of continued production, though variable cost is not met, are sometimes found where the preservation of valuable rights depends upon the rendering of certain services, as where the franchise of a street railway or bus company requires the operation of certain obsolete routes. The maintenance of dining car or Pullman service on many railroad runs does not

depend upon the adequacy of price to cover either the variable or overhead costs of affording the service. Instead it reflects more general considerations, such as the attitude of the traveling public toward the removal of such service, and the loss of the advertising value that completeness of facilities may have. This simply means, of course, that a part of the current outlay is recompensed indirectly, or represents a form of investment in goodwill for the future.

Differentiation of the Product to Maximize Revenue.

Even when price reductions are initiated by a rival concern, the producer, instead of cutting the price on his entire production, may often meet the situation by differentiating his output into several brands or lines. By utilizing one or more "low-priced" lines to meet the price competition of rival brands, he may prevent a considerable part of the loss in sales that would otherwise occur. The lower price of such a line will reduce the tendency for less firmly attached customers to shift to the rival products. At the same time, it will enable him to avoid reducing the prices of the "higher grade" lines to which some part of his trade is firmly attached. This development of price-product differentiation may be traced in many industries, but perhaps nowhere more clearly than in the rubber tire industry.

The terms "higher grade" and "lower grade" lines are placed in quotation marks, but this is not intended to imply that in all cases the grading is superficial. However, slight differences in specifications or appearance may, in many cases, permit wide differences in prices. Many consumers are persuaded, for example,

that the use of a cheaper grade of gasoline might be more costly in the end, due to the accumulation of carbon in their engines, or to other harmful effects. Or they can be persuaded that the added price for a slightly superior grade of rubber tire represents insurance against accidents caused by blowouts. In the case of many types of commodities, such as perfumes, candies, or notions of various kinds, a slight difference in the cost of packaging may result in a material increase in consumer appeal, and a much larger difference in the price that many customers are willing to pay.

Price and product differentiation make it possible for a firm to segregate the various components in the demand for its product and so to reduce the impact of price competition upon it. As a consequence of such differentiation, the firm may obtain larger total revenue than would be possible were a uniform price to be fixed for its entire undifferentiated output. In pursuing such a policy, the price of each "line" would be fixed, as nearly as possible, to maximize the net revenue from its sale; that is, the excess of the total revenue over the total variable cost of producing that line. Such a policy would enable the firm to obtain the largest possible net revenue from the sale of its entire output.

MONOPOLISTIC COMPETITION WHERE NUMBER OF FIRMS IS LARGE

Comparatively little need be said with respect to the problem of current price equilibrium where the number of producers of closely substitutable goods is large.

Under such conditions no one of them would have occasion to consider the indirect effect of his own price policy. With many producers of similar branded articles, a considerable change in the sales of one of them would have little effect upon the sales of any one of his rivals, and vice versa. For example, a considerable reduction might be made in the price of a particular brand of aspirin, or tooth brushes, without seriously affecting the sales of other individual brands. Under such circumstances, it would not be necessary for one producer, in fixing his price, to consider the reaction of his rivals to a price change.

Instead of endeavoring to expand the volume of sales by means of price reductions, the individual firms may place their reliance upon the arts of advertising, in the hope of attaching a larger number of buyers to their particular brands. To the extent, however, that each of the rival concerns indulges in competitive advertising, the general effect will be merely to reshuffle the buyers without increasing greatly the total volume of sales.¹¹

Equilibrium with Many Firms Producing Differentiated Products. Suppose that the effects of competitive advertising are already represented in the demand schedules for the products of the various rival producers. Stability of prices would exist, for the time being, when each producer had attained a price, volume of output, and sales that equalized his marginal

¹¹ Even competitive advertising, designed to push one brand of product against others, may, of course, have some general "educative" value in attracting customers who would otherwise not buy at all.

cost and marginal revenue. Full market equilibrium, however, would not exist as long as any one producer felt that additional expenditures on advertising, further product differentiation, or price changes, might enable him to obtain a larger net revenue. Such an expansion by one firm would reduce slightly the quantity that could be sold by each of the other firms at their existing prices. They would then be compelled either to curtail production somewhat (in order to bring marginal cost into line with marginal revenue) or else to embark on more extended efforts to extend their own sales by advertising.

Such a process of jockeying for position might continue indefinitely, and is, moreover, a permanent feature of actual business life. The failure to attain full stability in the relations among the many rival concerns does not, however, alter the nature of the tendency toward equilibrium. Such equilibrium would exist when all concerns had reached some acceptable division of the field, and had adjusted their respective outputs so that marginal revenues and marginal costs were equal.

SUMMARY

This and the preceding chapter have dealt with the forces affecting the current prices of commodities marketed under various conditions ranging from pure competition to pure monopoly. This involved a study of the conditions of equilibrium for an individual trading firm, under which it would obtain the maximum possible returns in a short period, and a description of

the relationships connecting the activities of rival firms in a common market or in related markets.

The discussion was confined to the process of adjustment that could occur in a short period. It assumed that the time available for adjustment was insufficient to permit substantial changes in the technical facilities for production, the entry of new firms into the business, or the exit therefrom of existing firms. In other words, a large part of the technical productive situation was assumed to be fixed and incapable of modification within the short period of time relevant to the problem of current price. On the basis of this assumption, it will be recalled, any consideration of the effect of variation in output upon overhead and average costs was unnecessary.

An adjustment of supply, demand, and price that represented an equilibrium position for a short period might not constitute an equilibrium adjustment over a period of sufficient length to permit more extensive changes in the facilities for supplying the commodity in question. Over such longer periods of time, tendencies toward equilibrium are always operating. At the same time, however, such movements are seldom fully completed because of continually changing conditions. These changes manifest themselves to the individual firm as negative or positive shifts in the demand curve for its product.

The following chapter will consider the normal tendencies of adjustment by individual firms to negative or positive shifts in the demand for their products, when sufficient time is allowed to enable them to re-

adjust their facilities for production. Such adjustments will be analyzed, first, as they would tend to take place under pure competition and, second, as they would tend to take place under monopolistic competition.

CHAPTER VIII

Normal Tendencies in Price Adjustment

PROCESSES OF ADJUSTMENT VIEWED AS TENDENCIES TO EQUILIBRIUM

FURTHER CONSIDERATION OF COSTS

Merging of Overhead and Variable Costs. If a sufficiently long period of time is taken into consideration, the distinction between overhead and variable costs tends to disappear, so far as their influence on price is concerned. Within a very short period, for example, even the wages of certain skilled laborers may be virtually overhead cost. The employer does not wish to take the chance of being unable promptly to secure their services again should they be laid off with a slackening of business activity. Over a longer period, sufficient to permit the training of such employees,

however, their wages would clearly be variable costs. The longer the period, the more fully the enterprise can adjust its outlays of all sorts to any specified volume of output.

For this reason it is sometimes stated that in a timeless economy all costs would become variable costs. The term "timeless economy" refers to one in which all the time needed to adjust the plant to any given output would be available, or, stated differently, one in which no time at all would be required to make any desired adjustment. In a timeless economy, the average variable cost curve would coincide with the average cost curve which, in the short period, would represent both variable and overhead costs.

The economy in which we live is not, however, a timeless economy. On the contrary, production is always carried on with a large amount of plant and equipment that is relatively unalterable over short periods of time. Consequently, no matter how much time is available for adjustment, individual firms will always, necessarily, have fixed investment and therefore overhead cost, within any short period of time. For this reason the distinction between overhead and variable costs will be maintained; but over a longer period of time the influence of both types of cost must be considered. Thus, the analysis of longer period equilibrium necessitates a consideration of average cost, as well as average variable and marginal costs. In the analysis that follows, the average cost curve, which represents both variable and overhead cost items, will be used in

investigating the conditions of longer period equilibrium.

The Significance of Overhead Cost. In the longer period, overhead cost becomes significant because most of the durable agents employed in industry eventually require replacement. Over a period of time, within which machinery and plant may wear out or become obsolete, the continuation of production at any specified volume of output will necessitate the purchase of replacements. These may be bought either with funds already accumulated out of earnings or with funds otherwise secured. The management will utilize funds for replacement of worn-out or obsolete facilities only if it is believed that more can be gained by such an investment than in any other way. In other words, the necessary fixed investment in the industry will be maintained, in the longer run, only if it is believed that overhead cost as well as variable cost can be met by the revenue from the sale of the product.¹

Thus far the discussion of overhead cost has been largely in passive terms, and has dealt with the amount of prospective return necessary to keep the investment in durable plant and equipment in an enterprise (or in an industry) up to a given level. It is also necessary to consider the amount of return required to attract

¹ Obviously the different items of plant and equipment, in which investments are made, vary in durability, so no definite period can be set as the dividing line between the "short run" and the "long run" that would apply uniformly throughout industry. It may be possible by statistical investigation to find averages for particular industries that would be reasonable indications of the significance of "short run" and "long run" for that industry.

new investment in additional productive equipment, either by existing firms or by firms entering the industry. "Normal" earnings on capital investment have frequently been defined as those that would induce neither an increase nor a decrease in the facilities engaged in the production of a given commodity.² Long-run equilibrium of demand, supply, and price would exist when there was no tendency for a disturbance of the equilibrium, either from the demand side or from the supply side. The latter condition would exist when normal returns to capital investment prevailed in the industry.

Relation of Average and Average Variable Costs. A final point that should be noted in considering the conditions of equilibrium is that the average costs of two or more different concerns may be the same, when each is producing at its optimum output, even though their average variable costs are different.

In agriculture, for example, the average variable cost of producing wheat (outlays for labor, fertilizer, power, etc.) may vary widely from good land to poor, larger outlays being required per bushel of product on poor land than on good. However, the differences in productive capacity of different grades of land are re-

²Recent economic literature has emphasized the point that there may be a range of returns on investment in industry, between an upper level, at which new investment would come in, and a lower level at which it would go out. If there are impediments to entrance into an industry the range might be comparatively wide. See, for example, Joan Robinson, "What is Perfect Competition?" *Quarterly Journal of Economics*, Vol. XLIX, 1934, pp. 104-120; and "Decreasing Costs", *Economic Journal*, Vol. LXIII, 1933, pp. 531-2. See also Harrod, R. F., "A Further Note on Decreasing Costs", *Economic Journal*, Vol. LXIII, 1933, pp. 337-41.

flected in the values of the land and, therefore, in the return on investment in the land. This difference in return would enter into average costs as costs of production on different grades, and so tend to equalize the average costs. In other words, high average variable cost may be offset by low average overhead cost, giving equal average costs for different producers. Likewise, different concerns might be producing similar products by different patented processes with different average variable costs. Nevertheless they would tend to have equal average costs when the return on the capital value of the patented process is included, as a part of overhead, in average costs.

ADJUSTMENTS TO SHIFTS IN DEMAND UNDER COMPETITIVE CONDITIONS

In order to illustrate the general character of movements toward equilibrium, the remainder of this chapter will deal with the adjustments that would occur (1) under conditions of pure competition, and (2) under conditions of monopolistic competition. Adjustments in response to a relatively sharp positive shift in the demand for one commodity, during a period of generally stable business conditions, will first be considered. Subsequently, the adjustments to a negative shift of demand, in a similar general setting, will be reviewed.

RESPONSE TO A POSITIVE SHIFT IN
MARKET DEMAND

Graphic Illustration. Under conditions of pure competition each individual producer will, in the longer run as in the short period, face the problem of adjusting his operations in view of a completely elastic demand for his own individual output. This demand curve is represented by the horizontal line *AR* in Figure 14. He will, as shown in the previous chapter, maximize his returns by producing the output at which marginal cost is equal to marginal revenue, which is also equal to the existing price. Thus in Figure 14, the demand, and average revenue, curve, *AR*, appears to the individual competitive firm to be completely elastic at the price of \$4.82. The optimum output will be 8.7 thousand units, since at that output the rising marginal cost curve, *MC*, cuts the marginal and average revenue curve, *AR*, *MR*. Production beyond that output by this firm would entail losses, because marginal cost would exceed marginal revenue; and average cost, *AC*, would exceed average revenue, *AR*.

Suppose, however, that a positive shift in market demand were to occur, either as a consequence of a growth in population, a change in consumer tastes, or for some other reason. This would have the effect of raising the market price of the commodity in question, at least for the time being, as compared with the price prevailing before the shift occurred. The new ruling price would exceed the average cost of production, including a normal return on the investment necessary

for the construction of new plants. Such larger returns would tend to cause new competitors to invade the industry, and existing plants would expand. This

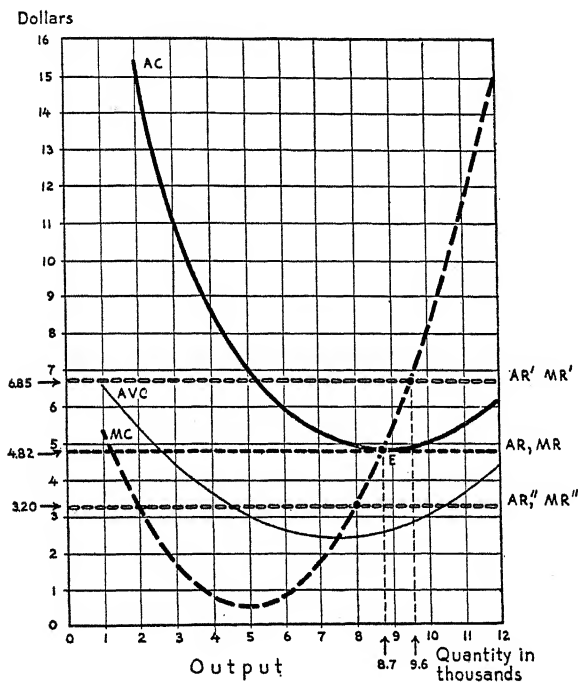


FIGURE 14. ADJUSTMENTS OF THE INDIVIDUAL COMPETITIVE FIRM TO SHIFTS IN DEMAND

situation is represented by the higher level of the average revenue curve, AR' , corresponding with a price of \$6.85. With such a shift in the demand and average revenue curve from AR to AR' , the firm would increase its output to 9.6 thousand units, at which point its

marginal cost, MC , would cut the new marginal revenue curve, AR' , MR' . It would obtain a total revenue of \$65,760 at a total cost of \$47,040, the excess over cost being \$18,720.

CHANGE IN OUTPUT OF COMPETITIVE FIRM RESULTING
FROM A POSITIVE SHIFT IN THE DEMAND CURVE

QUANTITY DEMANDED [also Output]	AVERAGE REVENUE [also MARGINAL REVENUE]	MARGINAL COST	AVERAGE VARIABLE COST	AVERAGE COST	TOTAL COST	TOTAL REVENUE	EXCESS
(Thou- sands)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)
8.7	4.82	4.82	2.50	4.82	41,934	41,934	
9.6	6.85	6.85	2.80	4.90	47,040	65,760	18,720

The ultimate effect of an increase in the number of firms, in response to the relatively high price, will be an extension of total production, indicated by a shift in the market supply curve. If the entrance of additional firms is not offset by a continuing expansion of demand, this change in the total supply situation of the competitive firms will eventually lead to a lowering of the prevailing price. If it be assumed further that there has been no change in the fundamental cost conditions of the individual firms, the producers already in the industry will be forced to curtail their production, and to accept lower net revenues.³

³ This assumption will be warranted if the industry in question makes use of a comparatively small percentage of the total supplies of raw materials, labor, and other indirect agents of the kinds that it requires, so that the larger demand of this industry does not markedly alter the prices of the materials, labor service, and facilities that it requires for production.

RESPONSE TO A NEGATIVE SHIFT IN
MARKET DEMAND

Graphic Illustration. A negative shift in the demand curve for the product as a whole might occur for many reasons, some of which have been indicated in the chapter on consumer demand. Such a shift in total demand would appear, to the individual producer under conditions of pure competition, as a lowering of the level of the demand curve for his own output, or, in other words, a lowering of the price at which he could sell any output he produced. This is illustrated by the following table, showing a change in the price from \$4.82 to \$3.20. It is illustrated graphically in Figure 14 on page 169, by the position of the average revenue curve AR'' , as compared with the curve AR .

CHANGE IN OUTPUT OF COMPETITIVE FIRM RESULTING
FROM A NEGATIVE SHIFT IN DEMAND CURVE

QUANTITY DEMANDED [ALSO OUTPUT]	AVERAGE REVENUE [ALSO MARGINAL REVENUE]	MARGINAL COST	AVERAGE VARIABLE COST	AVERAGE COST	TOTAL COST	TOTAL REVENUE	DEFICIT
(Thou- sands)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)
8.7	4.82	4.82	2.50	4.82	41,934	41,934	
8.0	3.20	3.20	2.40	4.90	39,200	25,600	13,600

The negative shift in the demand curve would necessitate a decrease in output by the individual firm to the point indicated by the intersection of the MC and MR'' ,

AR'' curves. With larger output marginal cost would exceed marginal revenue. The price per unit, or average revenue, received, would be less than average cost, and total revenue would fall short, by \$13,600, of the amount necessary to maintain intact the investment in the industry. This output, however, would hold the deficit to its lowest proportions; any other output would involve heavier losses. So long as this situation prevails, new firms will not be attracted to the industry, and firms already in the industry will permit some plants and facilities to wear out.

The Point of Equilibrium. At the price of \$4.82, with demand as illustrated by the curve *AR*, *MR*, in Figure 14 on page 169, the prevailing price coincides with both average cost and marginal cost. The condition of competitive equilibrium would be attained, therefore, when, for every producer, average and marginal revenues were equal to average and marginal costs. Under such conditions no change could be made that would improve the position of any producer, and there would be no incentive for anyone to enter the industry.

So long as the price was less than average cost, there would be no incentive for new enterprises to enter the industry. At the same time, there would be a stimulus for existing enterprise to withdraw as quickly as possible. Equilibrium would ultimately be restored when the withdrawal of firms from the industry had once more shifted the aggregate supply curve for the industry so as to restore the price to correspondence with average costs. As firms withdrew from the industry,

each remaining individual firm would expand gradually, as the rising price made it advantageous for it to do so.

In ultimate equilibrium the firms remaining in the industry would be operating at optimum capacity, with prices, average revenue, average cost, marginal revenue, and marginal cost all equal to each other. This position of equilibrium is indicated in Figure 14 by the point at which the average cost curve, AC , is tangent to the average revenue curve, AR , and at which the marginal cost curve, MC , cuts the marginal revenue curve, MR . Since the average revenue and marginal revenue curves coincide, all these curves meet at the same point. This point of equilibrium is marked E in Figure 14.

Possibilities of Shifting from Overexpanded Industry. The adjustments to an equilibrium position would be most rapidly achieved, of course, if shifting out of the industry were possible for some, even if not all, of the firms without serious losses of investment. Under such circumstances the decline in prices would encourage withdrawal or curtailment of output by those firms whose prospects of eventual profit were least bright, or for whom relatively more attractive openings appeared elsewhere.

This adjustment would be more likely to occur rapidly if overhead cost constituted a comparatively small part of average cost, and variable cost a large share. Under such circumstances a relatively small reduction in price would leave some variable costs uncovered. If so, the curtailment of production would follow quickly in the face of price reductions, and the

adjustment of prices and costs would be effected with comparative smoothness.⁴

Recapitalization. If the industry involves heavy initial capital investments it is obvious that, both in the initial period of shifting demand and in the subsequent period of adjustment, the process of accommodation is likely to be prolonged and more difficult. With a larger proportion of overhead to total cost, price may decline considerably below average cost without bringing about any marked reduction in productive capacity or in supply. Anything received above variable cost will represent returns that otherwise would not be obtained at all. The extent of the reduction in supply, in response to lower prices, will depend on the shape of the marginal cost curve. In any event, adjustment through reduction of capacity is likely to involve considerable periods of time, especially if the facilities are durable.

The pressure of competition will, of course, bear heavily on firms that are burdened by heavy fixed charges.⁵ Failure to pay interest or principal on bonded debt or bank loans when due, or to meet accumulated obligations to others for the use of machinery, for materials, and the like, will in time force the bankruptcy of the weaker concerns. Whether or not this process of financial liquidation will also be accompanied by a proportionate abandonment of plant is a different

⁴It must be remembered that this discussion has been concerned throughout with the problems of adjustment to a shifting demand for a particular product during a period of general business stability. Business instability is discussed in Chapters XV and XVI.

⁵Fixed charges represent the contractual obligations of the firm to make current payments. For the most part they are elements in overhead cost, but overhead and fixed charges are not identical.

matter.⁶ The business firm may fail, but the business may be carried on by others. So long as the price of the product is in excess of the average variable cost, it will be advantageous for someone to continue production with the physical plant.

This continuation of "unprofitable" business is due to the fact that from the viewpoint of the creditors the going concern may be worth considerably more than the dismembered assets, whose separate value might be little more than that of junk. Thus, the creditors may agree to a compromise with the owners that will permit the existing firm to continue in the business with a lower burden of fixed charges. Or, if the firm is thrown into receivership and sold under the hammer, the price at which the plant is bought will be based, not upon its original cost, or even upon the cost of replacing it in its current condition, but upon the current prospects of the business. Thus, the failure of the weaker business firms does not necessarily eliminate their productive capacity from the competitive picture. On the contrary, the reduction of the nominal capital investment resulting from the receivership will enable the reorganized concern to continue with lower total cost than before, although variable cost and marginal cost will not be altered.

Obsolescence and Diversion to Other Lines. If there were no further changes in demand, the effective plant

⁶ It is frequently assumed, in discussions of price-cost relationships, that economic weakness, technical inefficiency, and high costs go together, and that the outcome of an unhampered economic struggle will be the survival of the fittest. This notion, however, is subject to as many qualifications in the economic as in the biological field.

capacity in the industry would, in the course of time, become adjusted to the current demand as a consequence of failure to replace worn-out or obsolete machinery. By failing to provide for depreciation and by prolonged undermaintenance, the owners of a declining enterprise might, by continuing production, succeed, over the years, in recovering a part of the investment "sunk" in the industry. Such sums would presumably be diverted to other forms of investment.

A more rapid adjustment of capacity to demand might occur as a consequence of the conversion of productive plant by some concerns to other lines where more promising opportunities existed.⁷ Such adjustments may be made by some of the stronger firms in the declining industry. The possibility of such shifting, however, is limited by technical considerations, and varies widely from industry to industry. Moreover, the qualities of management necessary to discover alternative opportunities and to effect the transition from one field to another are not always present.

Summary. Economic maladjustments may result from the misjudgment of various rival producers regarding the prospective demand for the entire class of commodities produced by the industry of which they are members. In addition, maladjustments result from errors in their forecasts of their own respective shares of the sales of the industry as a whole. If such mis-

⁷ Plant and facilities will continue to be used in a given line so long as the capitalized value of the returns so obtained is equal to or greater than (1) the value of the equipment if used in its most remunerative alternative employment, taking into account the cost of conversion, or (2) the value of the equipment as salvage, whichever is greater.

calculations result in extensions of durable plant and equipment, the increase in physical plant capacity may exceed the increase in the quantity demanded at a price sufficient to cover average cost.⁸

From that point onward the nature of the adjustment will depend very largely upon the subsequent trend in demand. If the positive shift of demand continues, the excess capacity is likely, eventually, to be absorbed. If the shift slows down, some excess capacity may remain unabsorbed for a considerable period. If the positive shift gives way to a negatively shifting demand, the problem of adjustment is further aggravated, to the extent that the reduction in demand proceeds faster than the retirement of productive capacity. This is likely to be the case where substantial investments in durable plant are involved.

In the short run, it makes comparatively little difference whether overcapacity results from an expansion of capacity that exceeds the increase in demand, or is the effect of a negative shift in demand. In a longer period, overcapacity caused by too rapid expansion may be corrected by a continuing positive shift in demand. But overcapacity caused by a persistent negative shift in demand will be corrected only by reducing productive capacity. Such reductions will commonly occur only over a considerable period of time. As a result of the lower prices, new investment will not be made in additions, and replacements will tend to be neglected.

⁸ Mistaken estimates of probable costs of production may also lead to overexpansion. Such misjudgment is disclosed in a higher level of average cost than had been estimated. This possibility will be considered at a later point. See below, Chapter IX.

A new position of equilibrium will be reached when the reduction of capacity has proceeded to the point where prices are again equal to average cost. Average revenues will then once more be sufficient to warrant the replacement and full maintenance of durable equipment.

ADJUSTMENTS UNDER MONOPOLISTIC COMPETITION

Under monopolistic competition the general processes of price adjustment are much like those already discussed, except that the individual producer is confronted by a sloped demand curve for his individual output.

POSITIVE SHIFT OF DEMAND AS A STIMULUS TO EXPANSION

Suppose, for example, that there is a positive shift in the demand for a patented or trade-marked product of a particular concern. The product may be either a new article or one taken from an older line, newly styled and advertised in a successful effort to catch the public fancy. Such a shift is represented by the position of the average revenue curve, AR' , as compared with that of the AR curve in Figure 15*a*, 15*b* on page 182. The resulting higher volume of sales will, within the limits of the productive capacity of the plant, tend to reduce average cost, because overhead will be spread over more units. This may be offset, however, by higher average variable cost. Higher prices will have to be

paid for materials obtained on rush order. Higher costs of overtime or inefficient supplementary labor, increased wear and tear, and the reduction of over-all plant efficiency with highly intensified operation will also contribute to an increase in average variable cost. Moreover, it may seem desirable to expand the plant, and to that end additional capital must be obtained. This will entail an increase in overhead cost.

Concurrently, the success of this particular concern will serve as a stimulus to other firms, in the same or closely related industries, to develop and market substitutes imitating the popular brand. As a result of the expansion of facilities (both by the original producer and by his rivals), the capacity to meet the greater general demand for products of this type will be increased. If optimism has swayed the various producers in their respective estimates of possible sales, the total capacity may considerably exceed that required to meet the maximum aggregate demands for products of this general type.

READJUSTMENT OF OVEREXPANDED ENTERPRISE

Suppose that each of the several producers finds that he has productive capacity considerably greater than is necessary to meet his share of total sales at current prices. He will have an incentive to cut his price in an effort to increase the volume of sales. Whether or not he does so will depend upon the consideration he gives to the probable reaction of the other producers. If retaliatory cuts on their part were unlikely, or if he

felt that they would not have a marked effect upon the demand for his own brand, he would proceed independently. Price cutting is likely to emerge if there are many rivals in the field, or if new ventures have been stimulated by the unusual profits of firms already in the field.

Indeed, the introduction of substitute brands is likely to be accompanied by offering them at lower prices in order to attract consumers' preferences. So long as the demand for the whole group of similar products is high, relative to the total supply, this element of price competition from "cheap" lines is unlikely to afford a serious threat to general price stability. Each of the producers is likely to maintain his prices, despite the existence of differentials between them. But as the expansion of total output of the different firms begins to dilute the business of each one, the situation changes. Each producer then becomes acutely conscious of the diverting effect of the price differentials, and price instability or price cutting may emerge. Price cutting by the producers of the higher priced varieties may take the form of general price reductions or it may be accomplished by the offering of "competitive" lines to meet price competition. The salability of these lines may be enhanced by the prestige of the less widely sold "quality" product.

The level at which the re-establishment of stability of prices and production may be achieved will depend upon: (1) the extent of overexpansion in productive facilities, (2) the trend in demand, (3) the ease or difficulty of withdrawing from the industry, and (4) the

financial strength or weakness of the rival concerns involved.

Graphic Illustration. The nature of the adjustments tending to produce equilibrium under conditions of monopolistic competition are illustrated graphically in Figures 15*a* and 15*b*, on page 182 and in the following table:

ADJUSTMENT OF INDIVIDUAL FIRM TO EQUILIBRIUM POSITION WITH RESPECT TO DEMAND CONDITIONS UNDER MONOPOLISTIC COMPETITION

(Industry in Disequilibrium)

QUANTITY DEMANDED (ALSO OUTPUT)	AVERAGE REVENUE AR'	MARGINAL REVENUE MR'	MARGINAL COST MC	AVERAGE VARIABLE COST AVC	AVERAGE COST AC	TOTAL COST	TOTAL REVENUE	EXCESS
(Thousands)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)
6.00	8.90	3.80	0.80	2.60	5.90	35,400	53,400	18,000
7.15	7.92	1.85	1.85	2.38	5.19	37,109	56,628	19,519
8.00	7.20	0.40	3.20	2.40	4.90	39,200	57,600	18,400

The demand for a given branded product is represented by the demand or average revenue curve, AR' , and the marginal revenue curve MR' in Figure 15*b*. The average variable cost, average cost, and marginal cost of production are represented by the curves AC , AVC , and MC , respectively. It will be noted that marginal cost, MC , would be equal to marginal revenue, MR' , at an output of 7,150 units. (See point marked E' in Figure 15*b*.) At this output the price obtainable, indicated by the point, P' , on the average revenue,

AR' , curve directly above, would be \$7.92, while the average cost, indicated by the corresponding point on the AC curve, would be only \$5.19. At this output, the total revenue would exceed total cost by \$19,519, the excess revenue being indicated by the shaded rectangle. Any other output would give a smaller total of excess revenue.

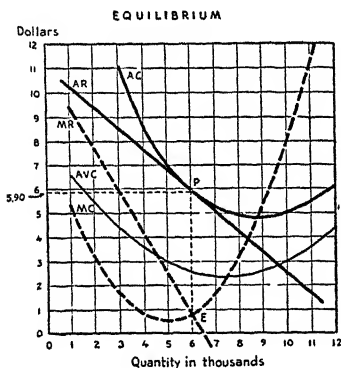


FIGURE 15a

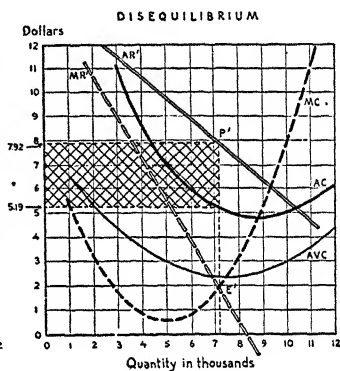


FIGURE 15b

Point of Equilibrium in the Industry. While the preceding section shows the point of equilibrium for a firm under given conditions, it does not illustrate the point of equilibrium for the industry. If the receipts of those already in the industry appear so favorable as to encourage the entry of new firms, the demand curve for each of the old brands would tend to be shifted negatively, as the total demand came to be distributed among a larger number of brands. The position of the curve AR , in Figure 15b, may be taken to reflect the

effect of such a shift.⁹ With the demand or average revenue curve shifted to this new position, the point of equilibrium for the individual firm would be that shown in the following table and illustrated in Figure 15*b*.

ADJUSTMENT OF INDIVIDUAL FIRM TO EQUILIBRIUM POSITION WITH RESPECT TO DEMAND, AND EQUILIBRIUM CONDITIONS FOR THE INDUSTRY UNDER MONOPOLISTIC CONDITIONS

(Industry in Equilibrium)

QUANTITY DEMANDED [also Output]	AVERAGE REVENUE AR	MARGINAL REVENUE MR	MARGINAL COST MC	AVERAGE VARIABLE COST AVC	AVERAGE COST AC	TOTAL COST	TOTAL REVENUE	EQUILIBRIUM OR DEFICIT
(Thousands)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)
5	6.75	2.50	0.50	3.00	7.00	35,000	33,750	-1,250
6	5.90	0.80	0.80	2.60	5.90	35,400	35,400	0
7	5.05	-0.90	1.70	2.40	5.26	36,820	35,350	-1,470

Net revenue for this firm would now be maximized at a price of \$5.90, with an output of 6,000 units. (See point *E* in Figure 15*a*.) At this output the marginal revenue, \$.80, would just equal marginal cost, as is indicated by the intersection of the *MC* and *MR* curves. The average cost would be somewhat higher, \$5.90, as shown by the point on the *AC* curve corresponding to this output, and would be just equal to the prevailing price, as is indicated by the tangency of the average cost

⁹ A similar negative shift of the average revenue curve of a firm producing one brand would occur if a producer of a rival brand succeeded in attracting the former's customers.

curve, *AC*, and the average revenue curve, *AR*. (See point *P* in Figure 15*a*.) The excess of total revenue over total cost has been wiped out by the negative shift of demand. At that point, the prospects of obtaining excessive profits by entering the industry, or by cutting prices, would no longer suffice to stimulate such action, and a point of price equilibrium for the industry would tend to be reached. Prices would then be maintained at existing levels even though both average and marginal costs could be reduced by expanding output.

Such a step would not be taken by the individual producer because, under the existing demand situation, the added output would yield marginal revenue smaller than marginal cost. For example, if the firm were to produce 7,000 units, marginal revenue would be negative, average revenue would be only \$5.05, and average cost would be \$5.26. This would result in a loss of \$1,470, total cost being \$36,820 as against total revenue of \$35,350.

In describing the conditions of equilibrium in an industry characterized by monopolistic competition, it is necessary to make an assumption already described in connection with pure competition. This assumption is that the average cost curve includes a return on fixed investment just sufficient in amount to prevent either the influx of new investment or the withdrawal of existing investment. On that basis, stability of prices and production for the industry will be attained when every firm is also in equilibrium. The volume of production and the price for each firm must be such that (1) its marginal revenue and marginal cost are equal, and

(2) its average revenue and average cost (including the investment item indicated above) are equal. Described in graphic terms, equilibrium will exist when the output of each firm corresponds to the point of intersection of the marginal revenue and marginal cost curves, and to the point of tangency of the average revenue and average cost curves. These conditions are illustrated in Figure 15a.

An individual producer will not expand his output if, as a consequence, his marginal revenue would fall below marginal cost. Therefore, stability of price and production could be attained in an industry with many firms, under conditions of monopolistic competition, even if each one of the firms could produce additional output at decreased cost.

The fact that one producer enjoyed lower costs than his rivals would not necessarily enable him to drive them from the market. Expansion on his part might be limited by the character of the demand for his product as compared with the demands for the products of his rivals.

“NORMAL TENDENCIES” NEVER ACTUALLY COMPLETED

This brief review of the “normal” relationships of cost, supply, and price, will suffice to illustrate the tools of analysis with which such problems may be attacked.¹⁰

¹⁰ For detailed discussion see Chamberlin, Edward, *The Theory of Monopolistic Competition*. The second edition of this work (1936) contains a valuable classified bibliography of the literature bearing on the issues discussed in this and the preceding chapters. See also, for general analysis, Robinson, Joan, *Economics of Imperfect Competition*.

The processes of price and cost adjustment described are never actually completed. In actual life there is never time for one adjustment to be worked out before the prevailing tendencies are modified, or even reversed, by changes in tastes, by the development of new products and new techniques, by the changing rhythm of the business cycle, or by the longer secular changes that gradually mold the character of economic activity.

CHAPTER IX

Supply and Price under Dynamic Conditions

THE LONG-TERM TREND OF EQUILIBRIUM PRICE

THE preceding chapter has described the conditions of equilibrium in the adjustment of the demand, supply, and price of a particular commodity over a period of time sufficiently long to permit the necessary changes in productive facilities to meet a change in demand. In this discussion it was assumed that the total demand for, and prices of, the requisite agents of production would not be substantially affected by a change in the output of a particular firm or industry.¹ It was also assumed that no changes in technique that would alter the equilibrium price and output were in progress.

¹ This assumption is warranted if the particular commodity represents only a small part of the total requirements for the different materials, labor, and other resources that go into its production. Under such circumstances any ordinary variation in the production of the particular commodity would involve a negligible change in the total demand for each of the constituent materials.

Over a longer period of time, however, the equilibrium price and production of a commodity may be altered, either as a consequence of a change in cost of production arising from a permanent shift in demand, or because of changes in the cost of production that occur independently of demand. An increase in demand, if it is met, will necessitate some increase in production. Such an increase in production, in turn, will react upon costs. Depending upon the conditions of supply, the ultimate equilibrium price may be either higher or lower than, or the same as, before the increase in demand occurred.

Without any shift in demand, however, the equilibrium price might also be raised or lowered, over a period of time, as a consequence of changes affecting the costs of production. Such changes that affect the equilibrium price directly, through changes in cost, include the discovery of new resources, the exhaustion of existing resources, or the development of new techniques. Such changes will be considered briefly at the end of this chapter. The earlier part of the chapter is concerned primarily with changes in cost that will result from shifts in demand. In this discussion it will be assumed that during the period of changing demand there are no discoveries of new resources or of technical methods previously unknown, although some known techniques may be adopted that would not have been practicable under previously existing conditions.

The long-period trend in equilibrium price for a given commodity depends upon the effect that an increase in the demand for it would have upon the costs

of the various firms producing it. In analyzing the long-term adjustment of supply and price to a change in demand, it is convenient to distinguish between what are termed economies and diseconomies of the firm, and economies and diseconomies of the industry. These will be taken up in order, in the following section, and then the discussion of the long-term supply situation for the market as a whole will be resumed.

CONDITIONS AFFECTING LONG-TERM TREND OF COSTS

Economies and Diseconomies of the Firm. In preceding chapters it has been shown that the average cost of production in a given plant will vary, depending upon the volume of output. Up to a certain point, expansion in output would reduce average overhead cost. It might also, to a somewhat lesser extent, reduce average variable cost. Eventually, however, average cost would tend to rise with increased output, because the decline in overhead cost would be more than offset by the increase in average variable cost.² These changes in average variable cost, resulting from changes in output, may be explained by conditions internal to the firm itself. When output is increased from a very low point, decreasing average variable cost may result from improved division of labor, fuller utilization of machinery, discounts on larger purchases, and so forth. Rising average variable cost, on the other hand, may result from such things as less efficient operation under

² It is here assumed that changes in output by the particular firm would not significantly affect the prices of necessary materials, labor, and supplies.

conditions of rush or overtime production, inadequate correlation of operations, or congestion in the plant.³

Those factors that tend to reduce the average cost of production of the individual firm with an increase in output are termed *economies of the firm*. Those conditions that tend to increase the average cost of production of the individual firm with an increase in its output are termed *diseconomies of the firm*.

Over a period of time sufficient to permit the individual firm to readjust the size of its plant, it may be able to attain additional economies in production by substituting a larger plant for a smaller one. The increase in the size of the plant would of course necessitate additional investment in facilities and equipment, and so would increase total overhead cost. If the increase in investment were directly proportional to the increase in output, average overhead would be unaffected. If, however, the larger plant would permit more effective use of certain facilities, the increase in output would be proportionately greater than the increase in investment. Average overhead would then be reduced.⁴ With a larger output, average overhead might also be reduced by the more effective use of the executive staff, better division of labor, and other similar economies in production. These gains that could be obtained by expanding the size of the individual firm may also be termed economies of the firm.

³ See above, pp. 100-102.

⁴ This is likely to be the case, within limits, because in a plant of a given size it is advantageous to have and use a certain large machine at less than its full capacity, rather than to employ some other method of performing the same operation. The capacity of the plant as a whole could be increased without adding any more of these machines.

In contrast with such advantages gained by enlarging the plant, the firm may suffer disadvantages of size. The expansion of physical plant beyond a certain size may involve difficulties in the routing of production, difficulties in administration and supervision, and so on. With the progressive increase in the size of the individual plant, the possibility of realizing additional economies is likely to diminish. At the same time, the possibility becomes greater that equally advantageous productive conditions could be obtained by constructing duplicate plants of no greater individual size. The individual firm might gain still further over-all economies in management by dividing production among a number of plants. But in the end, even such managerial economies of the firm might be offset by the development of topheaviness or unwieldiness in management, by bureaucracy and similar handicaps. Such circumstances as these, contributing to an increase in the average cost of producing on a larger and larger scale, are additional diseconomies of the firm.

Economies and Diseconomies of the Industry. In contrast with those circumstances, internal to the firm, that affect the average cost of production as the size of the firm is altered, there are also conditions that affect the cost of production throughout an industry, apart from changes in the size of the firms. An expansion in the demand for a given product, or closely related group of products, may lead to a reduction in the average cost of all the firms in the industry. This might happen if a larger demand for raw materials used in the industry were to stimulate improvements in the

methods by which these materials were collected, prepared for use, and sold. The increased volume of business might encourage the establishment of subsidiary industries to perform certain processes that could not be economically handled by a single firm, such as the production of special equipment, the provision of special services, and the like.⁵ Advantages of this sort, which result from an increase in the volume of production throughout an industry and do not belong to any particular firm, are termed *economies of the industry*. They have the effect of altering the average cost of all the firms in the industry.

An expansion in the volume of output in an industry may, on the other hand, adversely affect the average cost of production of the individual firms, giving rise to *diseconomies of the industry*. Such diseconomies of the industry would arise wherever the expansion in the volume of production was accompanied by a permanently increased price of certain essential means of production.

Suppose, for example, that there were a long-continued increase in the circulation of newspapers and magazines, as a consequence of which the requirements of the newspaper industry for newsprint in-

⁵ With the development of the railroad industry, for example, specialized producers of locomotives, cars, signal equipment, and hundreds of other specialties arose to serve that industry. The development of standardized varieties of these products involved many economies, in comparison with the situation that would prevail were each railroad compelled to provide all its own facilities or have them made by unspecialized producers of machinery. Similar situations exist in other large industries.

creased substantially. It might be necessary, under such circumstances, to supplement the nearer sources of wood pulp by shipments from more remote sources. The added cost of transportation incurred in meeting the demand for newsprint would be reflected in its price, and would raise the average variable cost of the newspaper industry.

LONG-PERIOD EQUILIBRIUM: PURE COMPETITION

LONG-PERIOD EQUILIBRIUM PRICE AND MARKET SUPPLY

Graphic Illustration of Long-Period Changes in Market Supply and Price. The varying possibilities with respect to long-run price equilibrium under conditions of pure competition are indicated graphically in Figure 16 on page 195. The upper section illustrates constant long-run equilibrium price. The middle section illustrates increasing long-run equilibrium price, and the bottom section the case of decreasing long-run equilibrium price. In each section of the figure the long-period increase in demand is shown by the positive shifting of the short-period demand curve from the position indicated by the curve D to the successive positions indicated by the curves D' and D'' .

With constant long-period equilibrium price, the shift in the short-period supply curve (from the S position to the S' and S'' positions) corresponds in

magnitude to the shift of the short-period demand curve. As a consequence, the price at which the quantity demanded equals the quantity supplied does not change with the increase in the quantity produced. With increasing long-period equilibrium price, the conditions of supply are such that some resistance to a permanent increase in output is encountered, resulting in a smaller increase in supply than in the first instance. As a consequence, a larger quantity will be produced, taking the industry as a whole, but the production of the larger quantity will involve increased costs of production. Thus, the equilibrium price for the increased output is higher than the equilibrium price at which a smaller demand would be met. The case of long-period decreasing cost is just the opposite. There, a permanent increase in demand results in changes in the conditions of supply that enable the production of a larger total quantity at a lower price. These three situations are frequently described as cases of long-run *constant cost*, *increasing cost*, and *decreasing cost*.

Constant long-run equilibrium price would mean, therefore, that, allowing sufficient time for adjustment, a larger quantity of output could always be produced in the industry as a whole, at the same average cost. Increasing long-period equilibrium price would mean that a permanent increase in the volume of production for the industry as a whole would be accompanied by increased average cost for the individual firms. Decreasing long-period equilibrium price, on the other hand, would be accompanied by decreased average cost of production for the various firms in the industry.

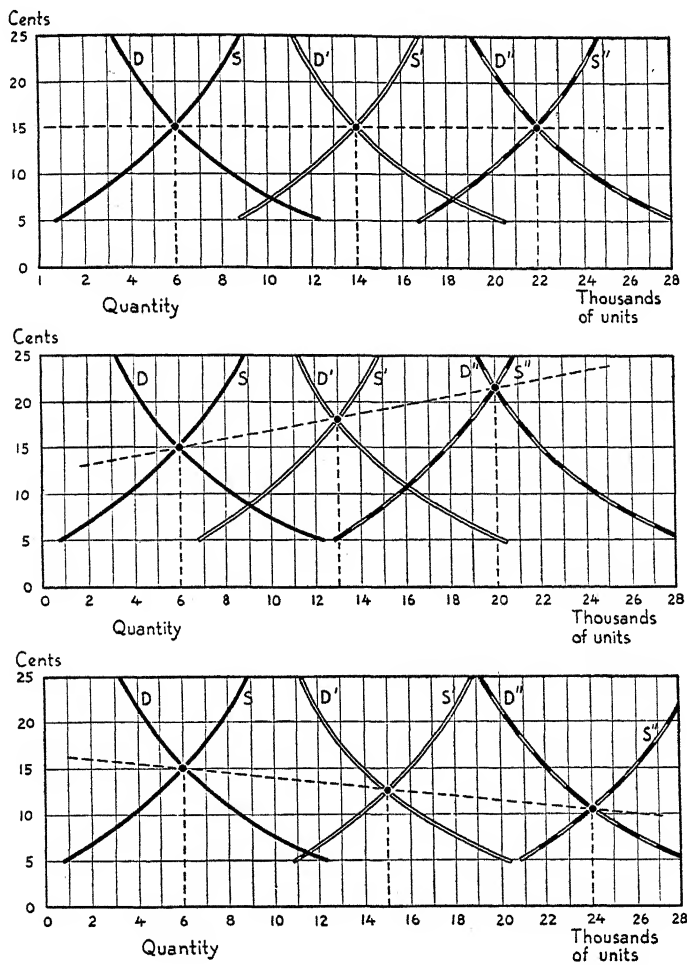


FIGURE 16. LONG-PERIOD ADJUSTMENT OF MARKET DEMAND, SUPPLY, AND PRICE UNDER CONDITIONS OF CONSTANT, INCREASING, AND DECREASING COST

CONSTANT LONG-PERIOD EQUILIBRIUM
PRICE

Nature of Adjustment of Total Supply to Change in Demand. The possibility that in the long period a permanent increase in demand would not result in any change in the equilibrium price has already been suggested. It remains to be seen under what conditions this result could occur. The primary condition is, of course, that the industry should be one of constant cost; that is, any change in the total production of the industry should have no effect on the average cost of the individual firms.

A moment's reflection will suggest that this condition eliminates any possibility of economies or diseconomies of the industry as a whole.⁶ It does not exclude those economies and diseconomies of the firm that give to the average cost curve of the individual firm its characteristic dished shape. It does presuppose, however, that whatever differences there may be in the size of different firms, their average variable costs will all be equal. Moreover, it presupposes that diseconomies of the firm will impose definite limits to the expansion of any individual firm.⁷

Furthermore, the gradual enlargement of output to accommodate the permanent increase in demand would necessarily result from the addition of new firms to the

⁶ Except on the rather unlikely assumption that such economies or diseconomies of the industry were precisely offset by diseconomies or economies of the individual firms.

⁷ The existence of continuing economies of the firm, obtainable by a continued increase in scale, would obviously be incompatible with long-period constant cost.

industry, because each of the existing firms would already be producing up to optimum capacity. Without a permanent increase in price, therefore, the existing firms would have neither the opportunity nor the incentive to expand output. Conditions of long-period constant cost would therefore prevail only if there were no physical or other limitations upon the entry of new firms into the industry, whenever the price was sufficiently attractive to induce new investment to be made.

What has been said indicates the improbability that many cases would be found in actual life of production under conditions of constant long-run cost and constant long-period equilibrium price. Possibly the most difficult point of all to accept is the idea that an increase in the demand for the product of an industry as a whole would not make possible an expansion in the output of existing firms. Yet this is inherent in the conception of pure competition. Under conditions of pure competition, the individual producer would have an incentive at once to construct a plant of the optimum size—that is, the plant that would enable him to sell the largest possible output with average cost no greater than the prevailing price. Having done so, it would obviously be impossible for him to find any better adjustment, so long as the price remained the same.⁸

Graphic Illustration. A graphic illustration that will help to clarify the conditions of long-period constant equilibrium price is presented in Figure 17 below.

⁸It must be remembered that technological improvements are here omitted from consideration.

Suppose that, given a sufficient period of time for adjustment, the managers of a particular firm might choose any one of three different sized plants, each of which would have a different capacity and different cost curves. Plant *I*, the smallest in size, would involve

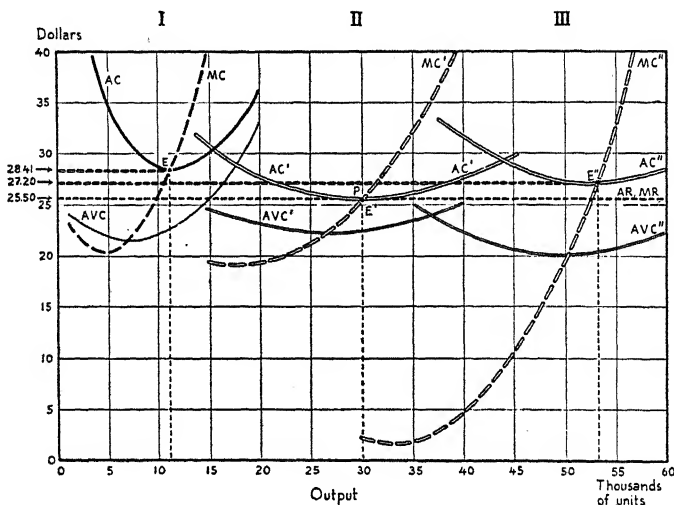


FIGURE 17. CONSTANT LONG-PERIOD EQUILIBRIUM PRICE
Adjustment of Size of Plant and Output by an Individual
Competitive Firm

overhead cost of \$65,340; Plant *II*, intermediate in size, would have an annual overhead of \$90,000; Plant *III*, the largest, would have an overhead of \$371,000. The *AC* curve indicates the variation in average cost over a certain range of output per year with the smallest practicable plant, *I*. The *AVC* curve indicates the average variable cost with such a plant;

the MC curve the marginal cost. The corresponding cost curves for a plant of intermediate size, II , are indicated by the AC' , AVC' , and MC' curves. The cost curves for the largest sized plant, III , are represented by the AC'' , AVC'' , and MC'' curves. It will be noted that the minimum average cost would be attained with a plant of intermediate size.

Assuming that it is possible for any individual firm to construct any one of the three plants represented in this illustration, neither the smallest nor the largest plant would be chosen, under conditions of pure competition. The smallest plant would be operated at a loss at any price less than \$28.41, but at that price handsome gains could be obtained by constructing plants of Size II and Size III . As a consequence of the construction of enlarged facilities, the market supply would rapidly expand, forcing the price downward. Equilibrium would be attained when the price had fallen to \$25.50, at which the average cost and marginal cost with a plant of Size II would be just equal to the prevailing price.⁹

If there were no obstacles to the continued duplication of plants of Size II , and no economies or diseconomies of the industry, the price of \$25.50 would constitute the long-period equilibrium price. Any increase in demand would eventually be met by the addition of more such plants to the industry. The fact that it was technically possible to produce with a larger plant (of Size III) would have no influence on the situa-

⁹ It will be recalled that average cost included return on investment sufficient to maintain the industry.

tion, because no firm could undertake production with such a plant. Although the average variable cost with such a plant would be lower than with a plant of intermediate size (representing, perhaps, the more extensive use of labor-saving machinery), the higher average overhead (representing the larger investment) would more than offset the lower average variable cost.

ILLUSTRATION OF LONG-PERIOD INCREASING COST: PURE COMPETITION

Conditions Leading to Long-Period Increasing Cost.

A permanent increase in demand for a given commodity would lead to an increase in its long-period equilibrium price if conditions of production at increasing cost prevailed. As already indicated, this means that the average cost of production of the individual firms supplying the market would increase as the total production in the industry was increased. It is necessary now to examine the conditions under which this result would accompany a permanent increase in demand.

The immediate effect of an increase in the demand for a particular commodity would be an increase in its price. This increase in price would, however, mean that the average revenue of the various producing firms was in excess of their existing average costs. As a consequence, the existing firms would expand their outputs, with increasing average and marginal costs.

At the same time, new firms would tend to enter the industry. The ultimate effect of this expansion by existing firms, plus the entry of new firms, would be to

drive the price down once more to the previously existing equilibrium level, unless, for some reason or other, the minimum average cost of production was permanently increased.

Such an increase in average cost might result because the enlarged demand for some scarce agent of production led to an increase in its price. Such a diseconomy of the industry would have the effect of raising the average variable cost of all the firms using that material in production. The same result would follow where the increase in the demand for the final product made it necessary for the firms in the industry to employ resources of different quality in production.

In the coal industry, for example, coal is produced in many different localities and under widely varying conditions. At some places it lies near the surface and may be taken out in great open excavations, steam shovels being used to load the coal directly into railroad cars. Elsewhere the coal is far underground, and must be worked by shaft-mining methods. The thickness of coal seams also varies considerably, as well as other natural conditions surrounding mining operations, making some coal easy to get, some difficult.

Inasmuch as the market requirements for coal are such that the total supply cannot be obtained from the most favorably situated mines, it is also necessary to carry on mining operations under less favorable conditions. Those mines that are engaged in production with inferior natural resources (that is, under more difficult conditions) have higher average variable cost than firms working under more favorable conditions.

They may also have larger average overhead costs, because a larger average investment in fixed plant and equipment may be necessary to cope with less favorable conditions. The differences in the average costs of differently situated producers tend, however, to be leveled out when the higher rents attributable to the ownership of superior resources are included as an element in overhead. Thus, the average costs of all producers, no matter how well or poorly situated they may be, will be equal to the equilibrium price when rents are counted as a part of average cost.

An increase in the total demand for the product, in such an industry, therefore, will be met both by an expansion in the operations of the existing firms, at increasing average and marginal cost, and by the establishment of new firms employing poorer resources. The ultimate equilibrium price will be higher, because the increased total demand cannot be met without the output of the firms employing poorer resources. The equilibrium price, therefore, will have to be sufficiently high to cover the average cost of production of such firms.

In the ultimate equilibrium the average cost of the more favorably situated firms will also be equal to the higher equilibrium price. The average cost curves of these firms will be shifted upward, so that their minimum points now correspond with the prevailing price. This upward shift will result in part from the increase in the average overhead cost of the firm, reflecting the increased valuation of resources owned and used by the firm. It will also probably reflect the effect

of increased investment in durable plant facilities by the firm. In either case, the output of the more favorably situated firm will be increased somewhat as compared with its output at a lower price. This follows because, with increased total overhead cost, its production can be extended somewhat further before the decline in average overhead cost resulting from increased output is offset by the increase in average variable cost.

Graphic Illustration. This situation is illustrated graphically in Figure 18. The total market situation is represented in the right-hand section of the figure by the shifts in the market demand and supply curves. The

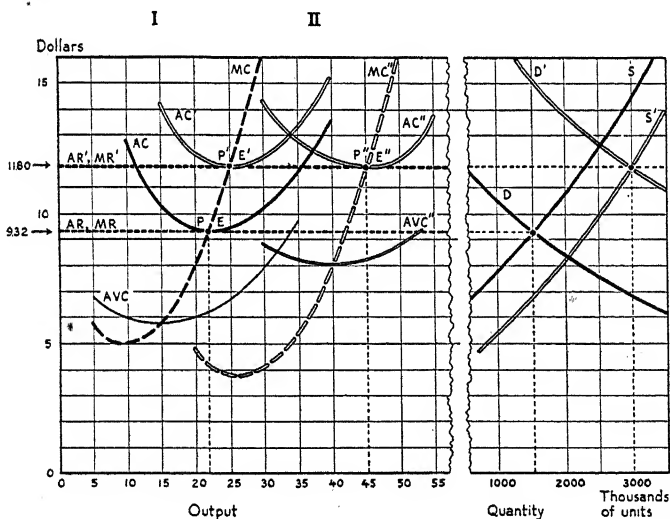


FIGURE 18. INCREASING LONG-PERIOD EQUILIBRIUM PRICE

Adjustment of Size of Plant and Output by an Individual Competitive Firm

higher long-term equilibrium price is indicated by the intersection of the shifted short-period demand and supply curves D' and S' . The left-hand section of the figure illustrates the changes in the output (and size of plant) of the individual firm that would tend to bring about the adjustment of supply to a permanent increase in demand. At the previous equilibrium price of \$9.32, a particular firm in the industry had been producing an output of 22 thousand tons, with average and marginal cost of \$9.32, just equal to the prevailing price. As the price was bid up from this level to \$11.80, in response to the more intense demand, the firm would at once expand its output to 25 thousand tons, at which point marginal cost would equal the new price. At this higher price it would become possible to construct a larger plant, represented by Plant *II* in the figure. This plant is assumed to have an output of 45 thousand tons, and marginal and average costs of \$11.80, just equal to the higher price. It would be advantageous to construct such a plant, however, only if it were impossible to duplicate the smaller plant of Size *I*, with its lower average cost.

The peculiar resources at the disposal of the existing firms (coal deposits, ore deposits, water power sites, or other special advantage) might not permit of exploitation on a substantially larger scale, and a duplication of the existing smaller plant might also be impossible. The actual expansion of output by a firm would then be determined by its existing curve of marginal cost. It would enjoy a lower average variable cost than other firms not possessing as favorable a situation, or resources of as high a quality. However, the additional

gains obtained would clearly be attributable to the possession of these advantages. The mineral reserves or other natural advantage would therefore be revalued on the basis of their ability to contribute to the earnings of the firm owning them.¹⁰ This would increase in proportion the overhead cost of the firm possessing such special advantages, and bring its average cost (including overhead) into line with the average costs of the other firms in the industry, and into line with the permanent level of price. This readjustment in the average cost of the individual firm is indicated by the new average cost curve, AC' , represented by the phantom curve at the left of the figure. In this illustration, the total overhead would be increased from \$67,760 to \$125,000, by virtue of the additional rent of the coal reserves or other natural advantage possessed. It will be noted that this new average cost curve reaches its minimum at the point of intersection of the marginal cost curve and the average revenue (or price) line. Although a lump sum addition to overhead cost would not change the variable cost curve or the marginal cost curve, it would raise the average overhead cost curve. As a consequence, the decline in average overhead cost would not be offset by the increase in average variable cost until a somewhat higher volume of output had been reached.¹¹

¹⁰ If the firm were willing to sell these resources, or the right to their use, they would command a higher price than before, because they would constitute an additional gain to any firm possessing them.

¹¹ This suggests that as one productive factor becomes scarcer, in comparison with the others, it is advantageous to use it more intensively (by increasing the amount of other agents used with it). This fundamental point in connection with the use and valuation of the factors of production will be developed more fully in Chapter XI.

The extension of output by firms already in the industry, in response to the increased demand (and higher level of price) would also be accompanied by the entrance of new firms. A higher equilibrium price would prevail, in the long run, only if the facilities that could be obtained by the new firms were, as a whole, inferior to those already in use. Otherwise the level of average variable cost would not be permanently raised.¹²

DECREASING COST FOR THE FIRM

If, under pure competition, economies of the firm could be obtained indefinitely with the expansion of output of the individual plant, the firm that first achieved a lead over its competitors would enjoy a continuous advantage. By selling at continuously lower and lower prices, more and more customers could be attracted. This would make possible still further economies, and eventually a monopoly of the entire market would be achieved.

In fact, however, economies of the firm tend to be offset by diseconomies, so that expansion by a firm normally reaches a point where increasing cost, instead of decreasing cost, would result from further expansion. It is not realistic to assume, therefore, that a firm could enjoy indefinitely decreasing cost as it expanded.

¹² Permanently higher prices cannot be accounted for by diseconomies of the firm, under conditions of pure competition, because such diseconomies could be avoided by reducing the size of the plant. Small firms entering the industry would enjoy lower costs than large firms already in. Increased numbers, therefore, would tend to expand total market supplies, and drive down the price to the old level.

Industrial history records many instances in which commodities have actually been produced at lower and lower prices, without the disappearance of competition in the industries concerned. Such a historical decline in cost is explained in considerable measure by general improvements in technique. It may also be due in part to economies of the industry that benefit all the firms without giving any single one a marked lead over its rivals. In either event the average cost of production of the various firms in the industry would be gradually reduced.

Summary. Expansion of individual firms under conditions of pure competition may take place under conditions of decreasing cost, increasing cost, or constant cost. These three possibilities, together with the characteristic conditions which would prevail, may be summarized as follows:

Constant long-period equilibrium price would exist if no economies or diseconomies of the industry accompanied an increase in total production. Adjustment would be accomplished chiefly by changes in the number of firms.

Increasing long-period equilibrium price would be accounted for chiefly by diseconomies of the industry; adjustment would be accompanied by an increase in the number of firms and an increase in the output of each firm.

Decreasing long-period equilibrium price would be accounted for chiefly by economies of the industry. Adjustment might be accompanied by an increase or decrease in the number of firms, and an increase or de-

crease in the output of individual firms, depending upon the extent to which economies of the industry reacted upon overhead as compared with variable cost.

Although the foregoing discussion has been based upon the assumption of a long-period increase in demand, it is possible that the demand for a particular commodity might show a permanent decline over a long period of time. In that event the general adjustments described above would tend to be reversed. Existing plant facilities would not be replaced on the existing scale as they wore out, and technical processes would be gradually adjusted to the new conditions of demand and cost.

ADJUSTMENTS UNDER CONDITIONS OF MONOPOLISTIC COMPETITION

In considering the long-period adjustment of demand, cost, output, and price under conditions of monopoly or monopolistic competition it is unnecessary to repeat the analysis of the connection between the output and costs of the individual firm. It will suffice to see how the policy of the individual firm would be affected if it were confronted by a sloped demand curve for its own product, rather than by the completely elastic demand curve of the individual firm producing under conditions of pure competition. The differences are brought out most sharply in the situation where expansion in output by the individual firm would be accompanied by decreasing average cost. This situa-

tion will, therefore, be examined in fuller detail than the case of constant or increasing cost.

DECREASING COST

Graphic Illustration. Figure 19 illustrates the adjustment of output, cost, and price under conditions of

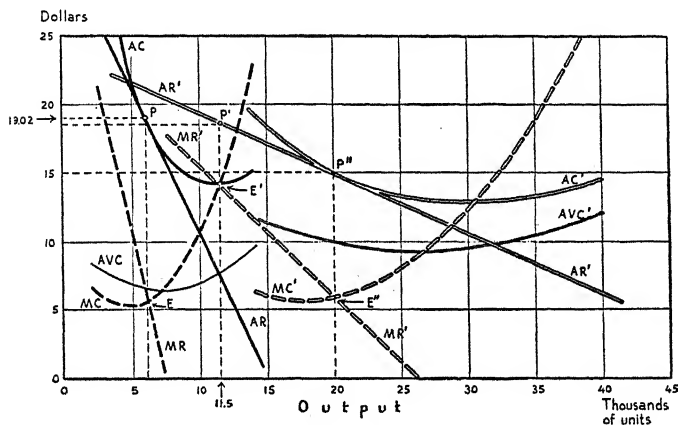


FIGURE 19. DECREASING LONG-PERIOD EQUILIBRIUM PRICE
Adjustment of Size of Plant and Output by a
Monopolistic Firm

monopoly or monopolistic competition, where an increase in the output of the firm would lead to a decrease in its average cost. A long-term increase in the demand for the product of the firm is indicated by the two sets of average revenue and marginal revenue curves. The heavy average and marginal revenue curves, AR and MR , indicate the original conditions of demand; the shaded curves, AR' and MR' , indicate

the ultimate conditions of demand, subsequent to the shift.

With the original average and marginal revenue curves, the firm would have no incentive to expand its output beyond six thousand units. Although a further expansion of output would reduce average cost still further, the marginal cost of added output would exceed the marginal revenue. As the demand for its output increased, however, the average revenue and marginal revenue curves would be gradually shifted to the right. As this change occurred, it would be advantageous for the firm to expand its output accordingly, at gradually reduced prices. With the smaller plant, output would ultimately be increased to 11.5 thousand units. Such an output would maximize the revenue obtainable with the smaller plant, when demand conditions had reached the final position indicated by the AR' and MR' curves. This is indicated by the intersection of the marginal cost curve, MC , and the new marginal revenue curve, MR' , at the point marked E' .

Under these conditions of demand, however, it would also become feasible to substitute a larger plant, with which the costs of production would be as shown by the AC' , AVC' , and MC' curves. If such a plant were substituted, however, the equilibrium output would be, not 11.5 thousand units sold at a price of \$19.02, but rather twenty thousand units, selling at a price of \$15.00. With this larger output, average cost, AC' , and average revenue, AR' , would be equal. Marginal cost, MC' , would also be equal to marginal revenue, MR' ,

at \$6.00 (the point in Figure 19 marked E''). Thus, with demand conditions shifted to the point indicated by the AR' curve, the individual firm would be in position to choose whether to continue with a smaller plant, or to go over, instead, to production with a larger plant. Until the increase in the demand for its product had shifted that far, however, it would be advantageous for the individual firm to continue with the smaller plant, because the average revenue obtainable from sales would be insufficient to cover the average cost with the larger plant.

The existence of conditions of monopoly or monopolistic competition in production, therefore, means that the individual firm will not necessarily have an incentive, as under pure competition, to proceed at once to the construction of a plant of the most efficient size; that is, a plant in which the lowest possible average cost of production could be attained. The monopolistic firm will do so only when the demand for its own differentiated product becomes sufficiently large to yield average revenue equal to the average cost of production with the most efficient plant. Meanwhile it can continue to produce, with the smaller plant, at a higher price and higher average cost than could technically be attained, because its monopolistic or semi-monopolistic position prevents its elimination from production by other rival concerns.¹³ Under conditions of pure competition, however, the firm that did not succeed in producing with average cost equal to the

¹³ If, for example, it had a completely elastic demand for its product, as under pure competition.

costs of other producers would eventually be eliminated; it could not continue to obtain a higher price for its output than was obtained by its competitors.

INCREASING COST

With increasing cost, it would be to the advantage of the individual firm to expand the size of its plant under substantially the same conditions as those already described in connection with decreasing cost. Thus, as the demand for the product of the firm gradually increased, production would for a time be increased by expanding the output of the existing plant despite increasing average cost. The actual output and price at any time would, of course, be so adjusted that marginal revenue and marginal cost were just equal. Eventually a point would be reached at which the firm could do either of two things: it could produce a certain quantity with the existing plant, and sell it at a comparatively high price, or it could construct a new plant, and produce and sell a larger quantity at a lower price. In either case the marginal cost would just equal the marginal revenue, so either alternative would constitute a point of maximum net revenue for the plant in question.

Graphic Illustration. This is shown graphically in Figure 20. Under the original demand conditions (represented by the *MR* and *AR* curves in Figure 20) the monopolistic firm would produce six thousand units, selling them at a price of \$9.85. With that output the marginal cost, 56 cents, would be just equal to marginal revenue. (See point *E*.) Suppose that, as a positive shift

in demand occurred, the average and marginal revenue curve were shifted from the position indicated by AR and MR to those indicated by AR' and MR' . Output in the smaller plant would be expanded to the point at

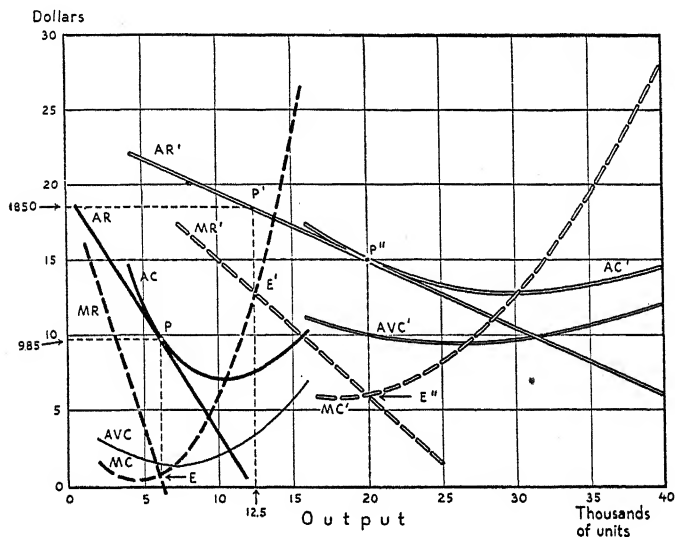


FIGURE 20. INCREASING LONG-PERIOD EQUILIBRIUM PRICE
Adjustment of Size of Plant and Output by a
Monopolistic Firm

which marginal cost, MC , cut the new marginal revenue curve, MR' . (See point E' .) With the smaller plant 12.5 thousand units would be produced, and sold at a price of \$18.50, as compared with the previous price of \$9.85. However, if the increase were believed to be permanent, it would also be advantageous to enlarge the plant, even though the minimum average

cost with the new plant would be greater. The marginal cost, average variable cost, and average cost, with the new plant, are represented by the curves MC' , AVC' , and AC' in the figure. With such a plant, it would be possible to produce an output of twenty thousand units, selling (under the changed demand conditions) at a price of \$15.00, for at this output the new marginal cost and the new marginal revenue would be equal. (See point E'' in Figure 20.) This would represent the present equilibrium adjustment to the positive shift in demand. The price would be higher than before the shift occurred, but lower than if the new plant had not been built.

SIGNIFICANCE OF EXCESS RETURNS

The question naturally arises: Why would a firm expand its undertakings, if it could get excess returns with a smaller plant and only normal returns on a larger one? To this question there is a twofold answer. In the first place, the total normal return on the larger investment in the larger plant would probably be as great as the normal return plus the excess return obtainable with the smaller investment in the smaller plant. In this connection, it should be remembered that return in excess of the normal return on investment has been defined as one that would induce additional investment. Thus, if excess return were obtained, the enlargement of the plant would logically follow.

In addition, however, expansion would probably be necessary, at least under conditions of monopolistic competition, if the firm wished to maintain its foot-

hold in the industry. It could, for the time being, sell its products in remunerative volume at a price of \$18.50. If it continued to do so, however, while its rivals expanded, they might eventually be in position to displace it from the industry. This latter point applies especially to conditions of decreasing cost.

EFFECTS OF CHANGES IN AVAILABLE RESOURCES AND TECHNIQUE

The long-run trend of cost, production, and price is profoundly affected by the progressive exhaustion of existing resources, or the discovery of new sources of supply. It is also affected in unpredictable ways by the development of new technical methods that alter the quantity and character of the means required for production. Changes in the population of a nation, in its level of technical skill and knowledge, and in its resources, significantly affect the general standard of living, and thus react on human welfare. The remainder of this chapter is not concerned, however, with this general problem of human welfare. Instead, it is devoted to the more limited task of sketching briefly the typical adjustments in industry that result from significant change in technique or the discovery of new sources of materials.

Adaptation to Changing Technique. The effects of a new development in technique are seldom fully revealed until long after the development is first introduced. It may require many years for a new technique

of production completely to displace the previous methods, if, indeed, complete displacement ever results. If a new technique, involving substantial reductions in the average cost of production, is introduced in an industry characterized by competition, a permanent decline in the price of the product is likely to occur.

Under such circumstances, the price will fall below the average cost of production of firms employing the older methods of production. (See illustrations in Figures 17 and 18). However, as long as the average cost of production with the new method is greater than the average *variable* cost under the old method, the old method will continue to be employed in previously existing plants. This results from the fact that a larger return could be obtained by the owners of those plants by operating the old equipment than would be obtained if it were junked.

Thus far it has been assumed that the technical change would have no effect on the variable costs of firms employing the older methods. If the labor, materials, and other things required for the production of the commodity by the old method are all in general demand throughout industry, and the quantities used in the industry undergoing change are small in proportion to the total quantities employed in industry as a whole, their prices would be comparatively unaffected by changes in the particular industry.

However, if certain factors of production were of a specialized character, and utilized for the most part in this particular industry, a change in methods of

production in it would substantially alter the total demand for those factors. Under such circumstances the firms operating under the old methods might be able to reduce their variable costs by paying lower wages to specialized laborers, lower prices for specialized materials and services, and so on. These reduced wages and other payments might not be so low as to drive the laborers and suppliers of services to seek immediate alternative employments. However, they might be insufficient to maintain a permanent supply of such services at the disposal of the industry. Under such circumstances production under the old method would cease, ultimately, because the growing scarcity of these necessary materials would cause an increase in their prices, and therefore, in average variable cost. The old method of production would continue to be employed, in the ultimate equilibrium adjustment, only if it were possible in some way or other to adjust the long-run level of average cost of production by that method to correspond with the average cost of production under the new method.

An interesting illustration of the effects of such a technical change over a considerable period of time is afforded by the history of the glass bottle industry. In this industry the product was at one time blown "by hand" by highly skilled and well-paid workers, in plants that required a comparatively small investment in equipment and very little machinery in the accepted sense of the term. About 1900 the first of the bottle-blowing machines was developed, and by suc-

cessive improvements completely automatic machinery was introduced about 1917.

During this entire period, the hand blowers (and their employers) fought a rear guard action against the new methods. They reduced the labor cost per unit of product by increasing the output per man and concurrently reducing wages. As more and more of the total demand came to be supplied by manufacturers employing the automatic machines, the price came to depend more and more fully upon the cost of production under the machine method.

Other illustrations of the adjustments involved in the long-run displacement of one method by another are afforded by the changes that occurred during the Industrial Revolution in England. Still others appear in the course of the history of the iron and steel industry, the shoe industry, and many others.

Adaptation to Discovery of New Sources of Materials.

The discovery of new sources of materials, or the development of new methods of treating raw materials more cheaply (such as the invention of the cotton gin), or the development of cheaper transportation of raw materials to centers of production, all have the effect of reducing the variable costs of manufacturing industries. This tends to lower the average cost as well, and to be accompanied, over a long period of years, by declining prices for many kinds of goods. Throughout the productive system such changes in the prices of goods appear as economies of the industry to the firms that employ these materials as a means of production.

MATHEMATICAL NOTE

There are several points in this and the two preceding chapters that may, for some students, be clarified by presentation in mathematical terms.

Solution for Minimum Point of the AVC Curve. The minimum point of the *AVC* curve is obtained as follows.

$$(1) \quad AVC = a + bq + cq^2$$

$$(2) \quad \frac{dAVC}{dq} = b + 2cq = 0$$

$$(3) \quad q = -\frac{b}{2c}$$

Solving equation (1) for the value of q given in (3), gives the following value for *AVC*:

$$(4) \quad AVC = a - \frac{b^2}{4c}$$

Thus, the minimum point of the *AVC* curve is

$$q = -\frac{b}{2c} \quad AVC = a - \frac{b^2}{4c}$$

This point also appears on the *MC* curve. (See mathematical note at the end of Chapter VI.)

Solution for the Minimum Point of the AC Curve. The minimum point of the *AC* curve is found as follows:

$$(1) \quad AC = \frac{k}{q} + a + bq + cq^2$$

(where k is total overhead)

$$(2) \quad \frac{dAC}{dq} = -\frac{k}{q^2} + b + 2cq = 0, \text{ and hence} \\ -k + bq^2 + 2cq^3 = 0$$

From an examination of the graph of the AC and MC curves an estimate can be made of the value for q at which the AC curve is a minimum, for the minimum point of the AC curve is at its intersection with the MC curve. Experimentation in solving equation (2) above, for values close to the apparent low point, is the quickest method of finding the minimum of the AC curve. The correct solution yields zero value in (2) above.

Overhead Cost Cannot Affect the MC Curve. This can be quickly shown mathematically, for the MC curve is the first differential of the total cost curve —

$$\begin{aligned} TC &= AC(q), \text{ or} \\ TC &= q \left(\frac{k}{q} + a + bq + cq^2 \right) \\ &= k + aq + bq^2 + cq^3 \\ \frac{d TC}{dq} &= a + 2 bq + 3 cq^2 \end{aligned}$$

Therefore,

$$MC = a + 2 bq + 3 cq^2$$

It can be seen that the “ k ” term (total overhead cost) disappears, and whatever its value, the MC curve is not affected. The variable cost part of the total curve is

$$\begin{aligned} TVC &= q (a + bq + cq^2) \\ &= aq + bq^2 + cq^3 \end{aligned}$$

and

$$\frac{d TVC}{dq} = a + 2 bq + 3 cq^2$$

Therefore,

$$MC = a + 2 bq + 3 cq^2$$

Thus, the MC curve may be derived directly from the TVC curve, which is $q(AVC)$.

Finding an AR Curve Tangent to the AC Curve at a Given Point. The method by which an AR curve tangent to an AC curve at a given point may be found is as follows:

The slope of the AC curve at any point is

$$(1) \quad \frac{d AC}{dq} = -\frac{k}{q^2} + b + 2cq$$

The slope of the AC curve can be found from (1) for any assigned value of q . This slope will also be the slope of the AR curve and $AR = AC$ at the point of tangency. Then,

$$(2) \quad AR = a + mq \quad (\text{where } m \text{ is the slope found from (1) for an assigned value of } q)$$

The " a " in equation (2) can then be found by solving (2) for the assigned value of q and AC , because at that point $AR = AC$.

If the AR curve desired is a higher order equation, say, $AR = a + bq + cq^2$, the problem is slightly more difficult. It can probably most easily be explained by an example.

Figure 24b on page 251 has such an AR curve, where

$$AC = \frac{20}{q} + 2.8 - q + .2q^2$$

From (1) above, the slope of this AC curve is as follows:

$$(3) \quad \frac{d AC}{dq} = -\frac{20}{q^2} - 1 + .4q$$

The AR curve desired was one tangent to the AC curve at $q = 3$, where $AC = 8.27$. The slope at $q = 3$ is found by solving (3) for $q = 3$, and it is found to be -2.022 . This slope is the same as the slope at that point of the AR curve, $AR = a + bq + cq^2$, whose slope is

$$b + 2cq = -2.022$$

$$b + 6c = -2.022 \quad (\text{for } q = 3)$$

In order to complete the solution of the problem, a value must now be assigned to either b or c . Let $c = .1$, then

$$b + .6 = -2.022 \quad \text{and} \quad b = -2.622. \quad \text{Thus,}$$

$$AR = a - 2.622q + .1q^2$$

$$8.27 = a - 2.622(3) + .1(9)$$

$$a = 8.27 + 7.866 - .9$$

$$a = 15.26$$

Finally, therefore, the desired AR curve is as follows:

$$AR = 15.26 - 2.62q + .1q^2$$

Point of Tangency and the Intersection of the MR and MC Curves. The point of intersection of the MR and MC curves is always at a value of q corresponding to the value of q at which the AR curve is tangent to the AC curve. By definition,

$$\frac{dTC}{dq} = MC \quad (TC = \text{total cost curve})$$

$$\frac{dTR}{dq} = MR \quad (TR = \text{total revenue curve})$$

$$\frac{dAC}{dq} = \frac{1}{q} \frac{dTC}{dq} - \frac{TC}{q^2} \quad \text{and} \quad \frac{dAR}{dq} = \frac{1}{q} \frac{dTR}{dq} - \frac{TR}{q^2}$$

Therefore, since the point of tangency of AR and AC is where

$$\begin{aligned}\frac{d AC}{dq} &= \frac{d AR}{dq}, \\ \frac{MC}{q} - \frac{TC}{q^2} &= \frac{MR}{q} - \frac{TR}{q^2} \\ MC - \frac{TC}{q} &= MR - \frac{TR}{q}\end{aligned}$$

But by definition, $\frac{TC}{q} = AC$ and $\frac{TR}{q} = AR$, which

are equal at the point of tangency, and hence at that value of q , $MC = MR$.

CHAPTER X

Producer's Demand

SIGNIFICANCE OF PRODUCER'S DEMAND

INDIRECT AGENTS AND THEIR REMUNERATION

Significance of Indirect Use. In the earlier chapters of this book the point was emphasized that goods are valued, and a price is paid for them, because they are capable of satisfying the desires of people and are scarce in comparison with the desires for them. However, many different kinds of goods and a large proportion of human services never contribute in any direct way to the satisfaction of human desires. Yet they are constantly bought and sold. Such goods and services are valued because they contribute to the production of other things that are capable of affording satisfactions to people, and because they are so limited in quantity, in comparison with the use that could be

made of them, that there is competition for their use in the production of different consumers' goods.

The clothing manufacturer buys or leases a building and machinery, purchases cloth and other materials, and hires laborers, for the production of clothing. He does so simply because he believes that his finished product will be in sufficient demand to command a price that will repay his outlays and leave a gain for himself. The quantity of materials purchased and labor hired, and the extent of the facilities acquired, will depend upon his estimate of the demand for his product. A larger output will mean an enlarged demand for the necessary agents of production, and vice versa. Thus, fluctuations in the demand for finished products are likely to produce fluctuations in the demand for indirect agents.

In order to complete the analysis of the conditions that affect the prices of different kinds of goods and services, therefore, it is necessary to consider the circumstances that affect the demand for, and the supply of, those things that are used indirectly in production. Such things, which serve human desires indirectly, are often spoken of as *agents of production* or as *indirect agents*. The producer's demand for them may be spoken of as derived demand because it is derived from, and is dependent in large measure upon, the demand for the finished product.

Major Classes of Indirect Agents. For convenience in analysis, agents employed indirectly in production may be classified in four different groups: (1) materials and supplies, (2) services, (3) labor, and (4) facilities.

In the final analysis these groups may be summarized in a still more fundamental classification, namely human services and material resources. The more detailed classification is here desirable, because, at any stage in production, some agents are obtained from the primary sources in their elementary form (such as labor), whereas other agents are the semi-finished products of still more remote industrial stages.

Materials and Supplies. Raw or semi-finished products to be worked up into finished consumers' goods, or (like coal) to be consumed in the process of production, are simply goods that are a step further removed in indirectness from the final consumer. Metal bars and steel wire, produced by certain firms, are materials and supplies to many other concerns engaged in the manufacture of metal beds, metal furniture, nails, bolts, screws, etc. Nails, bolts, and screws are, in turn, purchased as materials by manufacturers of many types of wooden and metal products. Thus, the stuff of which consumers' goods are made can be traced back through more and more remote stages, to the elementary means of production; namely, material resources.

Services. In modern industry many services of an immaterial sort are performed by one business for another. Among such functions are advertising, communication, brokerage, insurance, banking, and the like. These functions involve a large element of personal service, but the services are legally rendered by persons to the advertising, banking, or insurance firm, which, in turn, sells the service to other firms. A com-

pany that employs an advertising firm to promote the sale of its wares does not pay the wages of the artists and copy writers directly, but pays a fee to the advertising firm. Thus, services of this character are bought and sold, just as goods are bought and sold, and one does not reach the ultimate seller of the labor involved until he goes back to the previous stage in the chain of production.

Labor Services. When the producer of a finished product employs labor for his plant, or clerks for his office, or an executive to supervise operations, the chain of production has reached its end so far as those specific services are concerned. The individuals are selling their own services, in return for personal incomes, and they are not, to any substantial extent, business organizations that in turn purchase still more remote agents of production. Thus, when one comes to the analysis of the price of human services, one has to consider, on the demand side, consumers' desires back along the chain of production to the point at which this service is being bought. He has to consider, on the supply side, the desires of the worker for the things that the wage received for his services will enable him to obtain. The willingness of the person to work under certain terms, as producer, will affect the price at which people, as consumers, can secure commodities and services to gratify their desires. On the other hand, the desires of people, as consumers, will affect the wage that will be offered to the individual, as a producer. The final link in the chain of related prices is that,

with this wage, the individual, as a consumer, will obtain goods and services to meet his desires; and this, in turn, affects his willingness to work.

It is customary, in economic analysis, to lump all sorts of personal service together under the general term "labor", and to speak of the compensation of such services as "wages." The use of such generic terms should not lead one to conclude that all sorts of personal service are homogeneous, or that any person could, if he but wished or persevered, shift himself from one kind of activity to another. Differences in personal ability, in training, and in opportunity divide people into what has been described as *noncompeting groups*, between which movement is very difficult. The services of different classes of skilled labor, of professional workers, of business executives, or of unskilled laborers, differ from each other in fully as great degree as do coal, oil, and lumber.

Facilities. The term "facilities" may be applied to all the durable agents of production that are not embodied in the finished product, but contribute to its production. Among these agents may be classed such things as land, buildings, machinery, tools, and the like. Economists sometimes distinguish land, mineral deposits, water-power sources, and natural resources in general from facilities that are capable of being reproduced. This is because the available quantities of reproducible agents may somewhat more readily be adjusted to progressive changes in requirements for their use than can the quantities of natural agents.

*PURCHASE AND SALE OF THE USE OF
INDIRECT AGENTS*

Where human services are bought, or durable agents are utilized, it is possible, and indeed necessary, to distinguish between the economic agent itself (for example, the laborer or the machine) and the service or the use that it affords. Except under a system of slavery an employer cannot buy the laborer himself; he simply buys the services of the laborer for the period of his employment. It is customary, on the other hand, for a manufacturer to own the machinery in his plant, and perhaps the land and the buildings. It is possible, however, also to carry on production in a rented building, and even with machinery that is owned by someone else and used under some form of lease.¹

Whether the facilities are owned by the producer or leased from someone else, a valuation will be attributed to their use during a specified period of time. This valuation affords a basis for determining what part of the overhead cost of the goods produced in that period is attributable to these facilities. Therefore, in dealing with the demand for the durable agents of production it is necessary to start first with a consideration of the demand for their *use* during a specified period of time, or for their use in producing a single unit of product.

The price that is paid for the use of a durable agent,

¹In the shoe industry many of the important machines are owned by the United Shoe Machinery Company and leased to the different shoe manufacturers. The rentals or royalties paid for the use of the machines are based upon the number of shoes turned out by them.

owned by someone else, is a *rent*. When the producer himself owns the agent he will attribute to its use, as a part of his costs of production, a valuation equivalent to the amount he would have to pay for its use if he rented it. This attributed valuation is called "*implicit rent*."

The Theory of Distribution. The analysis of the forces governing the prices paid for the use of indirect agents is very often referred to as the "theory of distribution." This is because the prices received for personal services, or for the use of material agents employed in production, constitute the sources from which people, as workers or as owners, draw their incomes under a system of roundabout production. The idea is frequently expressed by saying that people co-operate in production, and that the incomes they receive from the sale of their services, or for the use of their property, determine their ability to buy the goods and services that are produced. In other words, the incomes obtained determine the distribution or division of the common product among the people who have, in one way or another, taken part in production.

It is customary, in discussing the problems of distribution, to classify the incomes of people, according to the form of economic activity from which they are derived, into four major groupings: wages, rent, interest, and profits. Two of these classifications have already been touched upon. The term "wages" is applied generically to the compensation of all forms of human services. The term "rent" is applied to the price paid for the use of any sort of durable agent owned by

someone else. The term "interest" is applied, narrowly, to the amount paid by one person to another as compensation for the use of borrowed funds, and the term "profit" applies to any proprietary gain obtained by a person as an owner of a business enterprise. For purposes of economic analysis the meanings of interest and profits require some further refinement, and the discussion of these problems will be postponed until later chapters.²

The application of a special term, such as the "theory of distribution", to the analysis of the prices of certain types of agents or services should not lead one to conclude that different principles are to be found operating in those particular fields of pricing. The same general principles apply throughout the whole price system, and the prices of indirect agents, or of their uses, and the prices of services merely constitute sections of the entire system.

DEMAND OF THE INDIVIDUAL FIRM UNDER STABLE ECONOMIC CONDITIONS

RELATION OF THE DEMAND FOR AN AGENT TO THE DEMAND FOR THE PRODUCT

Analysis of Derived Demand a Further Application of Theory of Cost. In speaking of the demand of the

² See below, Chapters XIII and XIV.

individual firm for indirect agents, it is clear that the firm has simply been shifted from the supply side of the market for the finished product to the demand side of the market for the indirect agents that it uses. Thus, the analysis of the derived demand for indirect agents is simply a further application of the theory of cost already developed in earlier chapters.

For the sake of simplicity in this analysis, it is convenient, as before, to make two assumptions. The first is that the individual producer constantly endeavors to improve his own position, with respect to the relationship between cost and revenue, so as to maximize his net revenue (or minimize his loss). The second simplifying assumption is that each firm is engaged in producing only a single product.

On the basis of these assumptions, it would be advantageous to the individual firm to expand production so long as the marginal cost (addition to total cost) resulting from the expansion of production was less than the marginal revenue expected to accrue from the additional sales of finished product. This principle has already been abundantly illustrated in the chapters on supply. Here its relation to the demand for a particular agent that is used in the production of the finished good will be shown.

The simplest case would be one in which production was carried on by the individual firm with a certain fixed amount of overhead cost and a single variable factor of production, such as skilled labor. Such a situation might exist, for example, if the raw materials were free, and labor constituted the only variable

factor necessary to produce a product. Under such circumstances the firm engaged in making this commodity would produce the output that, under the given conditions of demand for the product, would give maximum net revenue. In other words, it would produce the output at which marginal cost would equal marginal revenue.

If the price of the single variable factor were high, marginal cost would equal marginal revenue when the firm was producing a comparatively small output. If the price of the variable factor were less, the average variable cost curve would be lowered. The marginal cost curve would be lowered also, and marginal cost and marginal revenue would be equal when a larger output was being produced. Thus, the firm would be prepared, under given conditions of demand for its finished product, to purchase a larger quantity of the variable factor of production at a lower price than at a higher price. Consequently, the demand curve of the individual firm for the agent of production would be negatively sloped.

Graphic Illustration. This situation is illustrated graphically in Figure 21 on page 234, assuming conditions of pure competition, and in Figure 22, on page 236, assuming conditions of monopolistic competition. In each case the curve AVC indicates the average variable cost of production if the price of the variable factor were high, while the lower curve, AVC' , indicates the average variable cost if the price of the variable factor were lower. The curve MC in each diagram indicates the marginal cost if the price of the variable factor were

high, and the curve MC' the marginal cost if the price of the variable factor were lower. In like manner, the AC and AC' curves reflect the position of the average

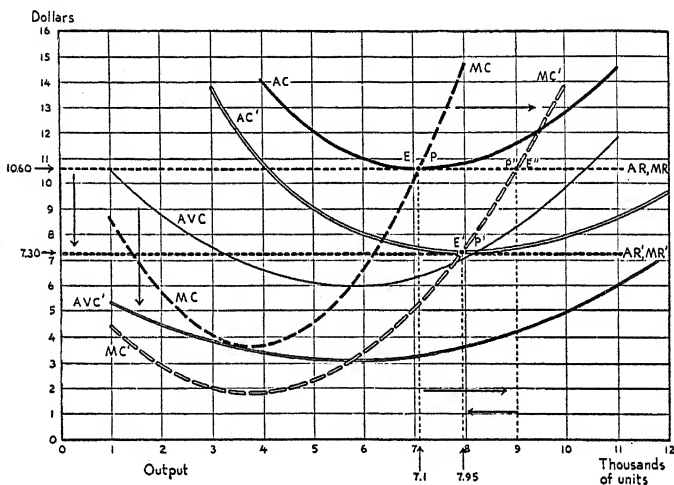


FIGURE 21. RELATIONSHIP BETWEEN THE DEMAND FOR AN AGENT OF PRODUCTION AND THE DEMAND FOR THE PRODUCT
Competitive Conditions

cost curves with high and low prices for the variable factor, with overhead cost the same.³

Under conditions of pure competition (see Figure 21) a reduction in average variable cost and in marginal

³ It will be noted that with a lower price for the variable factor the curvature of the AVC' curve would be less than the curvature of the AVC curve, and that as a consequence the marginal and average cost curves would also be altered. This follows because changes in money costs are expressed in terms of arithmetical monetary quantities rather than in terms of proportions.

cost would, in the short run, make possible an expansion in output by the individual firm, up to the point at which the reduced marginal cost, MC' , equaled the prevailing marginal revenue, MR . (See point E'' in Figure 21.) This would produce revenue of \$3.10 per unit in excess of average cost (for an output of 9,150 units, AC' equals \$7.50). The expansion in output would require the employment of additional units of the variable factor, as the firm would produce 9,150 units of output instead of 7,100 units. Thus, other things (including the demand for the product) remaining equal, the individual firm would find it advantageous to employ a larger quantity of a variable factor if its price were low than if it were higher.

In the longer period, a further adjustment would tend to occur under pure competition. A lower level of average variable cost would (assuming a given overhead) give a lower level of average cost, as indicated by the AC' curve. If so, the price of \$10.60, giving average revenue and marginal revenue of \$10.60 (see the AR and MR curves in Figure 21), would not be stable, because such a price would exceed average cost. It would therefore afford an incentive to expansion, not only by the firm, but also in the industry. Equilibrium would be attained when the expansion by the existing firms or the entrance of new firms had brought the level of prices down to \$7.30. (See point E' , indicating the new point of equality of marginal revenue and marginal cost.) At this price, the firm would find its average cost equal to the market price. At that price it would produce 7,950 instead of 7,100

units and employ somewhat more of the variable factor than it had originally, before the price of the variable factor was reduced. At equilibrium a similar situation with respect to the relationship between average cost and price would exist for other competing firms, including the new entrants into the field of production.

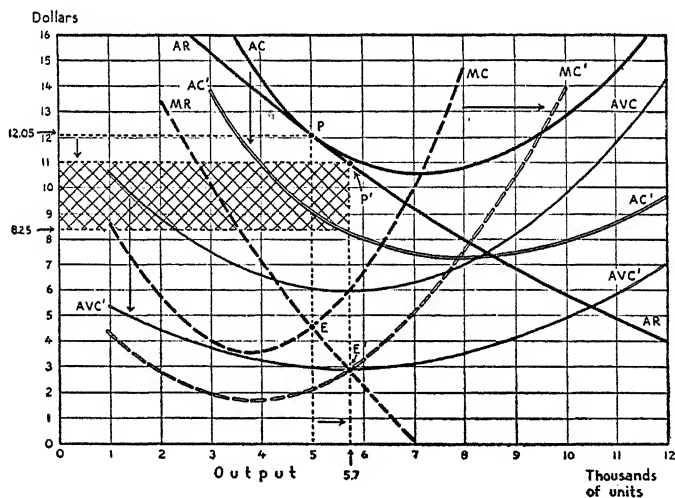


FIGURE 22. RELATIONSHIP BETWEEN THE DEMAND FOR AN AGENT OF PRODUCTION AND THE DEMAND FOR THE PRODUCT
Monopolistic Conditions

Under conditions of monopoly or monopolistic competition the average revenue and the marginal revenue curves, AR and MR , would be sloped instead of horizontal. As a consequence, the expansion of employment that would accompany a lower price for the

variable factor would be somewhat less than under pure competition. In the example shown in Figure 22, output would be expanded from 5,000 units to 5,700 units. (See point E' , indicating the equality of the new marginal cost and marginal revenue.) The advantage of the lower variable costs will not, under conditions of monopoly, be passed on to the consumer through competition. On the contrary, the new equilibrium price would be \$11.00, an amount that would exceed average cost by \$2.75 (\$11.00 less \$8.25, the average cost at an output of 5,700 units). The firm would continue to earn excessive returns, represented in the figure by the shaded portion of the diagram.

In the case of pure monopoly there would be no limitation upon the continued excessive return to the monopolistic firm. Under conditions of monopolistic competition, the continuation of these excessive returns would, in the longer run, be limited by the entry of new firms into the industry, offering the consumers substitute products manufactured from the same variable factor. This would eventually force the original producers to readjust their outputs and prices; otherwise, they might completely lose their markets. This would tend to bring average revenue and average cost for each firm once more into line, with marginal cost equal to marginal revenue. In this readjustment the use of the variable factor by the individual firm would tend to be somewhat less than when it was obtaining excess returns. The total employment of the factor, however, would be affected by the added demand of new firms for its use.

*SUBSTITUTION OF AGENTS AND THE
PROPORTIONING OF FACTORS*

Influence of Substitution. At many points in previous chapters the influence of substitution by consumers upon the demand for, and prices of, groups of related products has been seen. In like manner the possibility of substituting one factor or agent of production in place of another may affect the demand for, and prices of, related factors purchased by producers. It is to this latter type of substitution that consideration must now be given. Thus far in this chapter attention has been confined to the relationship between the demand for the final product and the demand for the factor. In order to bring this relationship into sharp relief it has been necessary to make the very extreme assumption that only one variable factor of production was, or could be, employed to achieve the desired result. This eliminated the possibility that this result might be achieved by employing two or more factors in conjunction with each other in varying proportions.

Yet the latter situation is the one most frequently encountered in actual industrial life, where the management of the firm may choose different combinations of agents, substituting one in greater or lesser degree for another if any advantage can thereby be gained. It is therefore necessary, in analyzing the forces affecting the demand for any single agent of production, to consider not only the demand for the final product, but also the possibility of substituting other agents for the one in question. The actual degree of substitu-

tion will depend, first, on the technical possibilities of varying the combination of agents of production and, second, upon their relative prices. The management will undertake to substitute one agent for another as long as the effect of the substitution is to reduce the total cost of the output actually being produced or contemplated.

The Technical Possibilities of Substitution. It is rarely true that any single agent of production is so indispensable to production that it is impossible to vary the quantity in which it is used, per unit of product, either by varying the quantity of some other agent employed, or by employing similar but not identical qualities of the same general type of agent.

It is probable that utilization tends to vary most nearly in proportion to output in the case of raw materials. A certain number of yards of cloth of a given quality are necessary in order to produce a thousand suits of clothing. A larger number of suits would require more cloth, and a smaller number, less. If the price of cloth were high, the amount of cloth required per suit would still be the same as that required if cloth were low in price. The demand for cloth would reflect fairly directly the consumers' demand for suits of the quality in question. Even in such a case, however, a high price for cloth would lead to the expenditure of more time by the cutters in reducing the wastage of cloth to a minimum; whereas, if the price of cloth were low, the savings in cloth would be less than the cost of the additional time of the cutters re-

quired if such care were to be exercised. Thus, even in the case of relatively indispensable agents, there is still some possibility of "economizing" its use by resorting to other agents if an advantage can be gained by so doing.

The great diversity in the technical possibilities of substitution may be indicated by listing some representative situations:

- (1) Where no substitution is possible
- (2) Where unlike agents may be substituted
- (3) Where inferior grades of the same type of agent may be substituted
- (4) Where identical or homogeneous units of the same type of agent may be substituted

It will be convenient, first of all, to consider the way in which the demand for a particular type of agent may be affected by the substitution of a different type of agent, as a consequence of a change in their respective prices. Some further consideration will then be given to the effect of the existence of inferior grades of a particular type of agent upon the demand for the superior grades. Substitution of identical or homogeneous units of the same type of agent is significant where the buyer may choose between a number of competing sellers of the agent.

EFFECT OF RELATIVE PRICES OF AGENTS ON THEIR USE IN COMBINATION

From the standpoint of business management the most desirable combination of factors, or the optimum

combination, is the one that would afford the highest possible net revenue for the firm. This condition would be attained when marginal cost and marginal revenue were equal to each other, and when the substitution of one factor for another, or vice versa, had been carried to the point where the addition to total cost (marginal cost) resulting from the addition of a further unit of one factor would exactly offset the reduction in total cost achieved by eliminating a unit of another factor from the combination. If, by substitution, the reduction in total cost exceeded the addition to total cost, the effect of substitution would be to reduce the total (and marginal) cost, and make possible a further extension of production. If the opposite effect were to follow, total and marginal costs would be increased, and the combination would diverge from the optimum (most advantageous to the firm).

Effect of a Change in the Price of One Factor. If the prices of two or more agents used in combination were to remain unchanged, it would be possible, by trial and error, to discover the combination that would be most advantageous under current conditions of demand for the finished product and, from this, to determine how much of each of the factors the firm would use. Suppose, then, that the price of one factor declined and the price of the other factors and the demand for the product remained the same. How much more of the now cheaper factor would the firm employ? Assuming that it were technically possible to increase the amount of that factor employed in the

combination, at the expense of the other factors, it is clear that it would be added to the combination so long as the savings achieved by reducing the use of the other factors exceeded the cost of the additional units of the cheaper factor.

Where a decline in the price of one factor of production, in comparison with another, leads to a very large degree of substitution of it for the other, the *elasticity of substitution* is said to be large. If, on the other hand, technical conditions do not permit any material degree of substitution in response to changes in the relative prices of the factors, the elasticity of substitution is slight. The elasticity of substitution will affect materially the character of the demand for a particular indirect agent. If the degree of elasticity of substitution is high, a lowering of the relative price of one factor will lead to a considerable expansion in its employment. If the elasticity of substitution is low, the demand for the use of the one factor will be more fully dependent upon the demand for the final product, and less dependent upon the prices of the other factors of production.

Effect of Changes in the Prices of Substitutable Factors. Thus far the demand for a particular agent has been considered on the assumption that other things remained unchanged. The demand curve, under such conditions, would indicate merely the different quantities of the agent that would be bought at different prices, provided other prices did not change. If, however, the prices of substitutable agents were to vary, the process of substitution would be reversed. If the prices of the substitutes were to decline, they would

be used more widely, and the whole demand schedule for the factor whose price was not changed would be altered. A final equilibrium would be achieved only when no firm, and no supplier of any factor, could make any further change in its use of factors, or in the price of its product, that would put it in a more advantageous position than before. It is scarcely necessary to say that inertia, lack of complete knowledge on the part of buyers and sellers, and unequal degrees of organization on the two sides of the market, prevent the attainment of such full equilibrium.⁴

The Substitution of Inferior Grades—Differential Rents. Very frequently there are different grades of a certain type of agent available for use, some of which are technically inferior to others as means of producing a particular product. A familiar example is to be found in the use of land for agricultural production. It is often possible to obtain the same total output of product (say wheat) by using the best quality of land and a relatively small quantity of other agents (labor, transportation, and so on) or by using a poorer grade of land and a somewhat larger quantity of other agents.⁵ The difference between what would have to be paid for the other agents in each of the two combinations is an indication of the economic advantage of using the

⁴Inertia, lack of complete knowledge on the part of buyers and sellers, unequal degrees of organization among buyers and sellers in a market, personal and accidental elements that tend to retard economic adjustment, are generally referred to as "frictional elements" or sometimes as simply "economic friction."

⁵The "quality" of land for producing wheat depends, in the economic sense, not only upon its fertility, but also upon its location with respect to marketing facilities. Under given conditions, for example, very fertile land may be economically of poor "quality" because of lack of transportation facilities.

better grade of land as compared with the poorer. It is termed the *differential* advantage of the superior grade of land as compared with the inferior.

Such differentials are illustrated graphically in Figure 23. Here the height of the white section of each

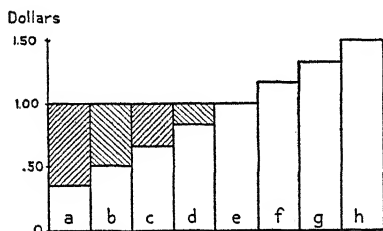


FIGURE 23. OUTLAYS PER BUSHEL REQUIRED FOR THE PRODUCTION OF WHEAT ON VARYING QUALITIES OF AGRICULTURAL LAND

vertical bar indicates the amount that would have to be paid for the use of *other* agents, per unit of product, in conjunction with different grades of land. The best grade of land is indicated by bar *a*, with which the other outlays are

smallest. So long as a sufficient number of units of the best quality of land (grade *a* in the diagram) were available, no use would be made of the poorer grades. If the demand for the product were such that it could not be met readily by the use of all the land of quality *a*, competition among producers of the finished product for the use of *a* would lead to a bidding up of its price. Eventually the price of *a* would reach a level at which it would be as advantageous to use the technically less efficient grade of land, *b*. The utilization of *b* would begin when the other costs of producing with *a* (represented by the unshaded part of bar *a*), plus the differential payment for its use, would be as great as the other costs of production, using *b*.

In Figure 23, it is assumed that the demand and hence the price for the finished product is such as to warrant the utilization of grades *a*, *b*, *c*, *d*, and *e*. The shaded sections above bars *a*, *b*, *c*, and *d* indicate the differentials attaching to each of them, as compared with the grade represented by bar *e*. That is, the shaded section of each bar (*a*, *b*, *c*, or *d*) represents the difference between the other outlays required per unit of output on that grade of land, and the other outlays per unit of product necessary on land of quality *e*. The grades represented by bars *f*, *g*, and *h* would, under the conditions here pictured, still lie outside the range of economic utilization.

As already stated, it is customary to speak of the payment (or allowance) made for the use of a physical agent as a rent. Where this rent is measured in terms of the difference between the amount paid for the use of an agent of a given grade, and that paid for the use of one of a poorer quality, it is termed a *differential rent*. In the same way, when the wages paid to workmen of one degree of skill are compared with those of a lower degree of skill, doing the same general kind of work, the differences in their wages are often referred to as *wage differentials*. If there is any possibility of substituting one grade for the other, it will be to the advantage of the employer to do so until the differential in rental payments or in wage payments is just sufficient to offset the difference in results obtained with the different combinations.

Under the conditions of demand for land use represented in the illustration, grades *f*, *g*, and *h* would not

be used, because the cost of producing with such land would exceed the cost of producing the same quantity with the use of better land, even taking the rent of the better land into account. Such grades are termed "no-rent" grades, because, under purely competitive conditions no rent would be paid for their use. The grade of land represented by e would be used, but it would be "no-rent" land since the outlays necessary for production upon it are just equal to the price that could be obtained for the output.

In this connection it is desirable to recall the discussion in Chapter IX of the tendencies to long-period equilibrium in an industry characterized by increasing costs. It was then stated that increasing average costs for the firm, in the long run, would be encountered only where the expansion of production in the industry as a whole necessitated the resort to the use of inferior resources. Under such circumstances the higher variable and overhead costs of the firms utilizing the poorer resources would be reflected in the higher level of their minimum average cost. But at the same time the average cost of production of the more favorably situated firms would be increased correspondingly, because of the increased *differential rent* attributable to the more favorable situation. To be sure, if the firm enjoying the use of superior resources owned them outright, its cash outlays would not be increased, but the right to use the agent could be sold for an enhanced price to some other firm. The differential would therefore appear in an enlarged overhead cost, because of

the increased valuation of the capital investment in the firm.⁶

AGGREGATE DEMAND FOR THE USES OF INDIRECT AGENTS

In the discussion of consumer demand the market demand for a given commodity was shown to represent the cumulation of the individual demand schedules of all the buyers in that market. The demand curve for consumers' goods was found to have a prevailingly negative slope, as a consequence of differences in tastes, differences in income, and the diminishing importance of the desires that could be satisfied with larger and larger quantities of a given kind of good.

The demand for the uses of indirect agents represents the cumulation of the demands of individual producing firms. The analysis of the preceding pages has indicated that, as a general rule, the demand curve for a given agent would have a negative slope. The individual firm would find it advantageous to buy more of a given factor at a low price than at a higher price; and furthermore a lower price for the agent would also (except under monopolistic conditions) offer an opportunity for additional firms to enter the industry,

⁶ That is, it would include the allowance of an opportunity cost in the form of the rent that *could* be obtained for the agent if the firm chose to rent it to some other firm instead of using it, or in the form of interest that the firm *could* gain by selling the agent and reinvesting the funds so obtained.

thus giving a further element of elasticity to the demand for the agent in question.⁷

THE ORGANIZATION OF DEMAND

Influence of Number of Buyers and Differentiation of Demand. The demand for indirect agents, however, may differ significantly from the demand for consumers' goods as a consequence of the existence of organization on the buyers' side of the market. In the sale of consumers' goods, the buyers are generally numerous, and seldom are a few buyers able significantly to influence the conditions of sale or the price. In the market for the uses of indirect agents, however, there are many instances in which the number of buyers is very limited. In the meat-packing industry, for example, a few large companies do a preponderant share of the business of slaughtering and distributing meat products. As a consequence the number of buyers of livestock for slaughter is quite small. In oil refining, also, a few large firms dominate the industry, and hence the number of buyers of crude petroleum is small.

A diversity of marketing situations may thus surround the sale of different kinds of indirect agents or their uses, ranging from the case of pure competition among the buyers, at the one extreme, to the case of a single buyer at the other extreme. Following the same order of arrangement that was employed in discussing organization on the selling side of the market, the fol-

⁷ This would be true under conditions of monopolistic competition as well, assuming freedom of entry into the general industry and access to the essential raw materials.

lowing representative situations on the buyers' side may be listed:

Pure competition among buyers

Monopsony (a single buyer, equivalent to monopoly — a single seller)

Monopsonistic competition (many buyers of the same general class of agent, but each requiring somewhat different qualities)

Oligopsony (a few buyers, either with standardized or differentiated requirements)

These various possibilities of organization on the buyers' side of the market may be paired with corresponding variations on the selling side. Monopsony on the buying side might be accompanied by pure competition on the selling side, or by monopoly, monopolistic competition, or oligopoly. It is unnecessary to consider each of the possible variations in market situation; an examination of one or two cases will suffice to illustrate the general effects of organization in the market upon the adjustments between demand, supply, and price of the uses of indirect agents.

Pure Competition among the Buyers. Where the number of buyers is large, and the purchases of each firm constitute a small part of the total quantity exchanged in the market, any change that might be made in the quantity purchased by a single firm would have a negligible influence on the price of the agent. Thus, under conditions of pure competition the supply curve of the factor, as it appears to the individual firm, is virtually a horizontal line, or is com-

pletely elastic. Under such circumstances the firm will buy the agent in question in whatever quantities are warranted by the current demand for its product and by the possibilities of substituting this factor for others whose prices may be changing relative to it. This is the position of any farmer in buying seed or fertilizer, or any small manufacturer in purchasing steel, coal, or other common materials.

Monopsony. A different situation would prevail, however, if a single firm were the sole purchaser of the service of a given sort of agent. For example, a manufacturer, whose plant constitutes the main source of employment for a given type of labor in an isolated mill town, might find himself in this position as a buyer of labor. Under such circumstances the supply curve of the agent, as seen by the buying firm, would be positively sloped. A larger volume of purchases would push the price to a higher level, while a restricted volume of purchases would reduce the price to a lower level. Beyond a certain point (an output of 2.5 thousand units in the example illustrated by Figure 24 on page 251), the production of a larger output by the firm would substantially increase its average variable cost because it would have to pay a higher price for the variable factor of which it is a monopsonistic buyer.⁸ The larger output would entail even a sharper rise in marginal cost.

⁸ Note that under conditions of monopsony the increase in the price of the variable factor, as the demand for it increases, gives rise to a diseconomy of the firm. Under conditions of pure competition, however, this increase in price would not be attributable to the change in output of any single firm, but would be due, if it occurred, to an expansion of the industry as a whole. It would therefore, under pure competition, lead to a diseconomy of the industry.

Suppose, for example, that the supply of a particular factor were relatively inelastic, so that only small changes in quantity offered would accompany comparatively large changes in the price of the factor. Under such circumstances it would be greatly to the

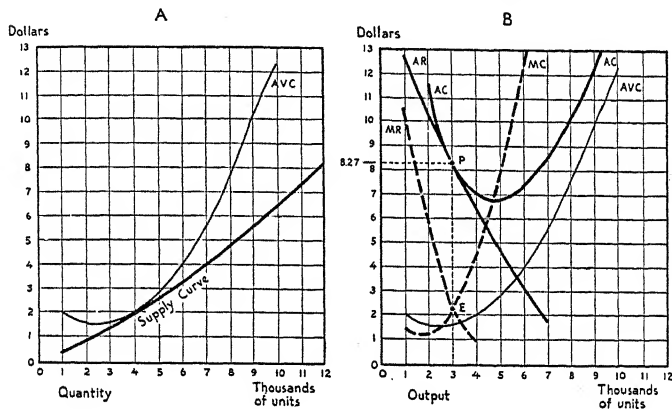


FIGURE 24. ADJUSTMENT OF OUTPUT BY A MONOPOLISTIC FIRM TO THE PRICE OF AN AGENT OF PRODUCTION PURCHASED UNDER CONDITIONS OF MONOPSONY

advantage of the monopsonistic buyer of this factor to restrict his purchases to a somewhat smaller quantity than would be offered at a low price. The restricted purchases of the particular agent might lead either to restricted sales of the finished product, or to the employment of substitute agents whose supply was less sensitive to variations in the quantity demanded.⁹

The relationship between the supply curve of the

⁹ In any event the price of the finished product would be adjusted so as to give an equality of marginal revenue and marginal cost. In the example shown in Figure 24, the conditions of supply of the factor would give the marginal cost curve a very steep slope, so that the equilibrium output for the firm would be reached at a comparatively small output.

factor and the average variable cost of the monopsonistic firm is suggested graphically in the left-hand section of Figure 24. Here a positively sloped supply curve for the factor is shown, together with another curve, labeled *AVC*, which represents the part of average variable cost that would be attributable to purchases of this factor. Diseconomies of the firm would give this average variable cost curve a "dished" appearance, even if the supply curve of the factor were a straight line. The right-hand section of the figure represents the equilibrium situation under monopsony, coupled with monopoly in the sale of the final product. It is here assumed that this factor is the only variable factor employed in production. The demand conditions for the final product are as represented by the average revenue and marginal revenue curves, *AR* and *MR*. The equilibrium output would be three thousand units, and the price of the product would be \$8.27. (The price of the product is indicated by the point *P* on the average revenue curve; the point of equality of marginal revenue and marginal cost is indicated by the point *E*.)

Summary. The discussion of the aggregate demand for particular agents of production, in periods of generally stable economic conditions, may be summarized by saying that with few exceptions the purchasers respond in the normal way to variations in the price of the agent, tending to purchase in larger quantity at low prices than at high prices. Technical conditions, however, limit the extent of the variation in utilization of agents within particular plants. Thus a consider-

able part of the slope of the demand curve for the use of an indirect agent is dependent upon the possibility that firms may enter into or withdraw from an industry in response to the changes in cost conditions that variations in the prices of agents would cause. There is likely to be considerably greater elasticity of demand for the services of particular agents over a longer period of time than there is at any moment of time, or within any short period.

Where the buyers in the market for a given agent are numerous, perhaps representing many different industries in which a particular agent may be used, no one of them is in position to influence materially the price of the agent. Each, in his calculations of costs, must take for granted the price, as determined by the interplay of aggregate demand and supply conditions. Those firms for which the particular agent is relatively indispensable will be prepared to pay a high price for some of the agent rather than suspend production entirely. A lower price, however, would induce them to buy more and to expand their undertakings. In like manner, if the price were lower, new firms would find it advantageous to enter the market as buyers.

On the other hand, when the number of buyers is so small that the purchases of any one will significantly affect the prevailing level of price, it may be to the advantage of the several purchasers individually to refrain from active competition with the others so as to obtain the advantage of a lower price for the common factor.

Wherever the buyers of a given factor of production are selling the final product under conditions of monopolistic competition, the expansion in the purchases of the factor by any one firm, in response to a given reduction in the price of the factor, will be less than if that firm were producing under conditions of pure competition. This follows because the firm cannot sell an indefinitely increased volume of its own product without reducing the price or incurring increased advertising expenses. This does not mean, however, that the demand for the services of a given agent in an industry characterized by monopolistic competition is necessarily inelastic, because the change in cost conditions resulting from a change in the price of the factor might be sufficient to induce the entry of new firms or the disappearance of existing ones.

DYNAMIC FORCES AFFECTING DEMAND FOR INDIRECT USES AND AGENTS

Thus far in this chapter the discussion of the demand for indirect agents has been based on the assumption of stability in general economic conditions. There remains to be considered briefly the effect of changing economic conditions upon demand. Four major types of changes that require some consideration are (1) shifts in the demand for final products, (2) changes in the available supplies and prices of substitutable agents, (3) cyclical fluctuations in business activity, and

(4) technological changes such as invention and innovation.

Shifts in the Demand for the Final Product. If, over a period of time, there were an increase in the demand for the final product, the effect would be to stimulate an increase in production of the finished goods. The extent of the increase, as already indicated in the discussion of dynamic adjustments of supply, would depend on the effect of the increased output upon cost. It would be advantageous to increase output up to the point of equality of marginal cost and marginal revenue. Assuming some possibility of substitution in the use of the indirect agents, the demand for all the constituent agents would also be increased, but in varying degrees, depending on the conditions under which each was supplied.

Suppose, for example, that a firm producing a consumers' good for which the demand was increasing could secure additional materials without a significant increase in price; and that it could use machinery and skilled labor in varying proportions. If labor of the necessary degree of skill were limited in supply, so that substantially increased labor services could be obtained only at higher prices, it would be advantageous to increase the fixed investment in machines, and to apply the labor only to those operations requiring the highest degree of skill. Thus the possibility of substitution of some other agent would serve to limit the extent of the shift in the demand for a specific agent that would occur as a result of a shift in the demand for the final product. What has been said of

an increase in the demand for the final product would also apply, in reverse order, to a decrease in the demand for the final product.

Changes in the Available Supplies of Substitute Agents. The effects that would follow from a change in the available supplies of substitutable agents have already been sketched, in the earlier part of this chapter, while discussing the demand schedule of the individual firm. The demand for a particular agent will also be increased if there is a permanent rise in the prices of agents that can be substituted for it. Such a rise in price of the substitutable agents might occur because of the exhaustion of convenient sources of supply or some equivalent circumstance. For example, the exhaustion of the convenient supplies of fuel oil would cause a positive shift in the demand for anthracite coal.

On the other hand, the development of new and cheaper sources of supply of substitutes would have the effect of reducing the demand for a particular agent, to the extent that it could be replaced by these substitutes. An interesting example of the influence of substitution is the development of rayon as a substitute for silk. With the passage of years, rayon fibers have been progressively improved and have taken the place of silk in many uses. Rayon has not wholly supplanted the use of silk, but has probably had the effect of limiting the demand for silk in comparison with what it would have been had rayon not developed beyond its original quality, or if technical improvements had not enabled its production at lower prices.

Cyclical Fluctuations in Business Activity. During periods of rapidly changing business activity the demand for particular agents of production is likely to show abrupt shifts. In such periods the combinations of agents actually employed may diverge considerably from those that would be chosen were it thought that the changes in the volume of business would be permanent. When business activity is expanding, it is advantageous to meet increased demands for finished products by employing additional labor, materials, and other agents with the existing fixed plant, despite sharply increased average and marginal costs. If the enlarged demand was believed to be permanent, however, the average and marginal cost of production would be lowered by increasing the proportion of durable plant and equipment utilized along with the labor. Thus, over a short period of time, in which business activity is increasing, the demand for certain agents may be shifted upwards to an abnormal degree.

In periods of declining activity, on the other hand, the fact that investment has been made in fixed plant and equipment as a means of economizing labor may lead to the employment of a smaller quantity of labor, and a larger quantity of durable plant and equipment, than would represent the optimum combination for the permanent production of a smaller output.

These maladjustments in the combination of factors that have just been described are examples of short-period movements away from the longer period equilibrium position. But as long as the economic world continues to manifest such periodic fluctuations in busi-

ness activity as are exhibited during the business cycle, the demand for the services of any type of agent is virtually bound to show abrupt, and sometimes extreme, shifts of position during the course of the cycle.

Innovation and Invention. The progress of innovation (the discovery of new products, new materials, new techniques) and the invention of new devices may, over the years, bring about profound changes in the demand for the use of particular types of economic agents. The history of almost any important industry includes many examples of sweeping changes in the need for certain types of skilled labor, in the need for certain types of mechanical equipment, and in the use of natural resources.

In the steel industry, for example, the discovery of the Bessemer process, and later the development of the open-hearth and electric-furnace methods of refining steel, rendered completely unnecessary the services of the old-time iron puddler. In the glass industry the gradual development of automatic machinery eventually substituted iron hands and compressed air for the skill and lungs of the glass blower.

Such developments often involve spectacular changes in the economic well-being of areas from which important raw materials are obtained, and sometimes pitiful changes in the status of proud classes of workmen. But to the extent that they make possible the production and sale of goods at lower prices they benefit consumers. The cheapening of certain goods will enable the consumers to increase their purchases of these and

other goods, thus leading to an increased demand for indirect agents of many kinds.

Whether the progress of innovation and technical change reacts as fully as it should to the advantage of the entire population depends in large measure on the degree to which the advantages of declining production costs are reflected in reduced prices for consumers' goods. As already pointed out in this chapter, the degree to which these advantages are passed on to consumers depends upon the extent of competition among the producing firms, both as buyers of indirect agents and as sellers of goods to consumers. To the extent that the decline in certain costs due to innovation and invention is offset by the expansion of other elements in cost (representing increased investment, the retention of differentials by monopolistic producers, or the upward valuation of patent rights and royalties) the advantages may be quite unequally distributed among different classes in the community.

CHAPTER XI

Wages and Rent

THE purpose of the present chapter is to discuss the special problems of supply that arise in connection with the use of human services and durable agents in production. The analysis will be concerned with the forces affecting the terms upon which people exchange their own personal services, or the use of property that they own, for income. The incomes derived from the sale of personal services will be generically termed "wages"; the incomes derived from the use of property in production will be termed "rents."¹

The preceding chapter indicated the divergent conditions under which the services of labor of certain types or the uses of particular kinds of durable agents may be bought, ranging from pure competition to monopsony. Similar differences appear when the marketing of these human services and uses of durable agents is viewed from the supply side. These differ-

¹ Whether or not these incomes are received actually in the form of contractual rents.

ences in supply situations arise out of the many circumstances that restrict the mobility of certain factors of production as compared with others and, therefore, that reduce the extent of competition on the supply side.

It is important to note, also, that a firm owning the land, plant, and facilities with which it carries on production can be thought of as supplying itself with the use of those agents. Similarly, the owner of a firm may work in the capacity of a manager, or may render other service, and thus may be himself supplying part of the labor services required by the business.

On the other hand, the market for many durable agents, or for a given type of skilled labor, may cover the area of a city, or an industrial area, within which there are several firms employing that type of facility or labor service. Such a situation approaches more closely the conventional idea of a market.

In either event, however, the fundamental question of supply analysis is: What conditions determine how much labor service, or how much use of a given type of durable agent, will be offered for productive use at a given wage or rent? How much more or less would be offered if the wage or the rent were either higher or lower? The answers to these questions, as applied to particular agents of production, will be affected substantially by the presence or absence of monopolistic elements on the supply side of the market, by conditions interfering with smooth economic adjustments (economic friction), and by the influence of dynamic

changes in conditions of supply and production. The following sections will deal first with the supply of human services, and thereafter with the supply of uses of durable agents.

WAGES AND THE SUPPLY OF HUMAN SERVICES

SHORT-PERIOD SUPPLY

Positive Slope of Supply Curve. Because of differences in personal abilities, inertia, and other circumstances of a frictional sort, it is seldom that complete uniformity of wages exists at a given time among all the members of any class of workers in a specific locality or market. Statistical studies of the wages of men doing the same kind of work usually reveal, however, a fairly high degree of clustering about some one rate of wages which represents the central tendency of the current wage bargains. It is this central tendency that is the object of analysis, and minor deviations from it will be ignored.

The short-period supply curve of labor services of a particular kind is ordinarily assumed to be positively sloped; other things being equal, a larger quantity of services of the desired kind would be offered at a higher wage than at a lower one. This variation in the quantity of labor services offered would result from (1) variations in the number of workers offering their services, (2) variations in the number of

hours of work per day, and (3) variations in the intensity of labor, that is, in the amount of work done per hour or per day.

A higher rate of wages might induce people for whom a certain occupation would otherwise be unattractive to offer their services. The possibility of attracting such recruits would depend, however, on the relative ease or difficulty of entering the occupation in question. If a considerable degree of skill and training were required, or other impediments to entrance existed (such as trade-union restrictions) this element of flexibility in supply would be negligible within any short period of time.

A higher rate of wages might also attract certain groups of workers who at lower wages would prefer leisure or employment in nonindustrial pursuits. The importance of this influence will depend largely on the nature of the alternatives open to the group in question. Many women, young people, or retired workers might be drawn into active employment by the offer of higher wages. The frequently voiced complaints that workers on relief are unwilling to accept conventional employment, though no doubt exaggerated, reflect the experience that the existence of relief has altered the short-period supply situation for many types of labor.

Some flexibility in the available quantity of labor services of a given type may result from the offering of extra compensation for overtime labor beyond the limits of the normal working day, or for extra output

within the normal working hours. Where the terms and conditions of employment are fixed by agreement between the employer and organized groups of employees, the latter are usually insistent upon provision for the payment of a higher rate for overtime. Although such punitive overtime rules are advocated on the ground that they penalize the employer if the workers are held on duty beyond the normal working day, the employees are usually eager to work overtime for the additional earnings they can obtain thereby. Disputes sometimes arise because the employees feel that overtime work is not equitably divided. Thus, it may be concluded that overtime work represents a further source of labor service that can be obtained in response to the offer of a higher price.

The Supply of Labor Related to the Demand for Income. In considering the nature of the short-period supply curve of labor of a given type, it is necessary to remember that laborers and others who sell their personal services are, for the most part, dependent on their wages or salaries for the personal incomes with which to meet their desires as consumers. The question is always open whether the goods and services that can be purchased with the wage are "worth what they cost" in labor output.

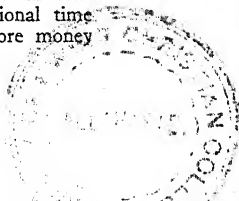
If a person were producing goods for the direct satisfaction of his own desires (as in an isolated primitive economy), he would presumably continue to work as long as the satisfactions to be obtained from the results of his efforts outweighed in his mind the sense of weariness with effort, or the rival attractions of

hunting, fishing, sport, head-hunting, or other expenditures of leisure time.²

Under the modern system of roundabout production, however, men work for the most part under the direction of others. They are not often free to vary their working hours, although they may perhaps vary the amount of work done during their working hours. Moreover they do not exchange their efforts directly for desirable goods and services, but for money wages with which to buy the desired things. Therefore, the ability of the individual to satisfy his desires will depend on the amount of his wage per unit of effort, as well as on the amount of effort he expends. With the same expenditure of effort, his ability to buy goods and services, and therefore to satisfy his desires, will be larger or smaller depending on the rate of wages at which his effort is compensated. Or, at a given rate of wages per unit of effort (as, for example, where men are paid on a piecework system) he could obtain a greater or smaller command over goods or services, depending on the intensity and duration of his working day.

There is thus a two-way comparison of alternatives: first, the comparison by the worker of the effort expended with the rate of wages received; and second, the

² Although it is convenient to think of leisure, or the distaste for additional effort, or some other balancing item as the "cost" or "sacrifice" to the individual involved in obtaining the additional income, it is not intended to imply here that the supply of labor is related to the "pain" involved in work. Men may be unwilling to work beyond a certain period, not because of the excessive "pain" involved in continued effort, but because they would rather use their additional time to go fishing or camping, or to play golf, than to obtain more money income with which to buy satisfactions.



comparison of the wages received with the goods and services they will buy. Under certain circumstances it is possible that the effect of an increase in the hourly rate of wages would be to reduce, rather than to increase, the willingness of workers to labor long hours, and vice versa. Suppose that wages were comparatively high, so that the necessities and some of the comforts of life were available to the average laborer. The increased enjoyment of goods and services obtainable by working longer hours (or at a swifter pace) at the higher wage rate might then seem less important than the advantage of additional leisure, or the enjoyment of a life less tinged by physical exhaustion. Under such circumstances higher wages might be accompanied by an actual reduction in the quantity of effort expended by the individual worker.

Suppose, on the other hand, that wages were low, and the demand of the individual laborer for income with which to buy the necessities of life was therefore urgent. A lowering of wages might then lead to an increase in the quantity of effort expended by the individual laborer, in an attempt to maintain his money income at a level sufficiently high to purchase these necessities.

The term "elasticity of demand for income in terms of effort" is sometimes applied to the relationship of the supply of labor to the demand for income. If the laborer's demand for income is very elastic, it means a given increase in money income will induce him to render more than proportionately increased service. Total effort expended will increase as total income

received increases. If the demand for income is inelastic, on the other hand, total effort expended will decrease as total income increases, and increase as total income decreases.

A good example of inelasticity of demand for income in terms of effort is found in the case of family labor. Where the income of the head of the family is small, the wife and children must seek employment in order to supplement the family income. As the income of the family head increases, the tendency is reduced for the wife and children to work. Another example of inelasticity of demand for income in terms of effort is the case of primitive or agricultural populations that have had no previous experience with the unending range of choice open to the modern consumer. Engineers and other supervisory officials of concerns operating in undeveloped countries with native labor, as well as spokesmen for companies employing negro or southern mountaineer laborers, frequently contend that high wages, instead of increasing the steadiness and willingness of their employees to stay on the job, simply result in a higher degree of absenteeism from work.

Under modern conditions, however, the demand for income in terms of effort is generally elastic. The negative relationships between supply and price described above would hardly be encountered under stable economic conditions. They are more likely to be encountered during periods of economic change, or when a very extreme shift in the demand for a particular commodity has pushed the wages of a specific

type of labor to one extreme or the other. Only occasionally does it seem probable that a higher price per unit of effort (without significant changes in general business conditions) would lead to an actual curtailment of the total services offered by a given class of labor. The assumption of a positively sloped supply curve for variations in wages, under short-period conditions, seems most likely to represent the prevailing situation in modern economic society.

Influence of Organization of Supply. In modern times there has been a tendency on the part of laborers, wherever possible, to organize the supply of their services in such a way as to restrict the full play of competition in the fixation of wages and other terms of employment. Some groups of laborers have also attempted to prevent the free entrance of would-be workers into their particular occupations in an effort to achieve and maintain wages and terms of employment more favorable than would prevail were entrance open to all.³

Where effective labor organization exists, the terms of employment are left to bargaining between the representatives of the employees in question and their employers. It is conceivable that with such organizations wage rates might be fixed at a level higher than that at which the quantity of labor demanded would equal the quantity available. If so, some members of the

³ It has been argued, on behalf of the organization of labor, that friction in the market for labor, together with varying degrees of restriction of competition among the buyers of labor, has had the effect of keeping wages lower than they would be under conditions of pure competition on both sides of the market.

group would tend to be unemployed, or only occasionally employed.

The maintenance of such wages by the group would depend upon their ability to provide for the unemployed members, in one way or another, and to prevent them from coming into competition with those who were employed. If the demand for the services of the group were relatively inelastic, it might conceivably be advantageous to the group as a whole to support the unemployed members by paying out-of-work benefits, or pensions to the older members of the group, so as to prevent them from becoming competitors. Such action would be analogous to the activities of a monopolist in restricting output in order to maximize his net receipts. In the case of labor organization, however, marked difficulties are likely to be encountered in maintaining permanently such restrictive measures or the necessary degree of control of the labor supply. This will be apparent from the discussion of the influence of cyclical fluctuations on the supply of labor services.

What has just been said applies fully only to the situation in which there is some competition among the buyers of labor. If a closely organized group of laborers were faced by a single buyer of labor, or by a very few closely organized buyers, the situation would be one of two-sided, or bilateral, monopoly. The actual rate of wages and amount of employment might vary within comparatively wide limits, depending on the relative strength of the two opposing groups.

INFLUENCE OF CYCLICAL FLUCTUATIONS

When general economic conditions are changing rapidly, as they are during certain stages of the business cycle, these general changes react profoundly upon the supply situation of almost all types of human services. In a period of business recession and declining employment, the fear of unemployment is widespread. All seek to protect their own jobs by working harder, and by accepting smaller compensation for the work they have been doing. These concessions, made in an effort to preserve employment, reflect the high degree of dependence of the individual worker upon the sale of his own services as a source of personal income. Even though diminished in amount, his wages are usually his only source of income.

The fears of those still employed and the efforts of those who have lost employment to secure jobs once more is revealed in the willingness to work for lower wages or to do more work for the same wages. This amounts to a positive shift in the supply curve for the service in question. The total number of people seeking employment of a given kind will perhaps not be increased, but the number willing to work at any particular wage will be increased.

In a period of business recovery, on the other hand, the increasing demands for labor relieve the fear that it will be impossible to find other employment if a particular job is lost. This greater degree of confidence on the part of people generally will be accompanied by a reduced willingness to sell their services at low

prices. Increased wages, reflecting the positive shifting in demand, may result in an increased valuation of leisure time by workers. This will be reflected in a demand for shorter hours of labor, and in the curtailment of labor by women and children to supplement family income. All of these circumstances contribute, in such a period, to produce a negative shift in the supply of a particular type of labor services, at the same time that the demand for labor services is shifting positively. Thus the demand and supply tend to shift in opposite directions both in periods of increasing prosperity and in periods of business recession.⁴

As a consequence of these generally opposed tendencies in the shifting of demand for and supply of labor, very sharp changes in wage rates have been found to occur during periods of business decline and recovery. The reduction of wages during a business decline is reflected in the extension of "sweated" industry at such periods. The movement for restoration of wages and the re-establishment of other desired terms of employment in periods of recovery is reflected in the wave of labor unrest and strikes that is a characteristic of that phase of the cycle.

Many circumstances operate to prevent the smooth adjustment of the demand for and supply of labor of any particular kind during changes in business con-

⁴The negative shifting of the supply curve here discussed is an entirely different thing from the inelasticity of demand for income in terms of effort described in the preceding section. The negative shift in labor supply curve reflects a change in conditions occurring with the passage of time. The inelasticity of demand for income in terms of effort refers to variability of attitudes of workers at a given time; that is, in the short period.

ditions. Ignorance of the conditions in the labor market on the part of laborers and employers, immobility of labor, and unequal degrees of organization on the two sides of the market may result in the payment of wages that deviate sharply from those that would prevail under conditions more nearly approaching pure competition on both sides.

Where labor is organized effectively it has been the usual policy of the unions to maintain wages as nearly unchanged as possible during periods of business decline, so as to avoid the necessity of a struggle to obtain the restoration of previously existing rates when recovery comes. In many instances, however, the rates maintained are purely nominal, and various forms of concession are introduced to permit members of the union to obtain employment at lower actual wages. To the extent that wages are maintained in the face of negatively shifting demand, the probable effect is to reduce the quantity of employment as compared with that which could be obtained at a reduced wage.

DYNAMIC FACTORS AFFECTING THE SUPPLY OF LABOR

Gradual Transfers between Noncompeting Groups. At any given time different classes of labor are separated from each other by differing requirements with respect to personal abilities, training, skill, and the like. To the extent that these differences restrict movement from one group to another, they separate the labor supply into noncompeting groups. Within certain limits the wages of one group might rise or

fall, in the short period, in comparison with the wages of other groups, before significant movement from one to the others would be evidenced. The greater the degree of training or skill required, the less the likelihood of such shifting of labor. Much of the adjustment of the relative numbers in different classes of labor is likely to occur only over longer periods. Such adjustments will be effected mainly by changes in the number of younger workers seeking to enter the various groups, rather than by the shifting into other pursuits of workers already trained for a particular occupation.

Over a period of time long enough to permit the training of new workers, the number of people prepared to render services of a given kind will depend upon the attractiveness of that employment as compared with other forms of employment open to people possessing the requisite personal qualifications. There is a consequent tendency for more or less permanent wage differentials to appear between different occupations. These differentials reflect, on the one hand, the relative attractiveness of the occupations and, on the other hand, the difficulty of qualifying for employment in each of them. Some of the difficulties arise out of requirements with respect to personal qualities, training, education, or experience, that few are able to meet. Other difficulties result from restrictions applied by those already in the occupation to prevent its becoming overcrowded with excessive numbers of aspirants.⁵

⁵ As, for example, certain trade-union rules, the restrictions applied to admission to the legal, medical, and other professions, the requirement of licenses for certain occupations, and so on.

Within a certain range it is possible that changes in a particular wage rate upward or downward would have little immediate or ultimate effect on the quantity of services of that kind available. A movement in the rate beyond those critical points (or differentials), however, would stimulate substantial variations in the quantity of services available, by attracting more than the usual proportion of recruits to the occupation, or by diverting them to other more promising or less unattractive pursuits.

*DYNAMIC FACTORS AFFECTING THE
TOTAL SUPPLY OF LABOR*

The many different classes of labor may be thought of as subdivisions within the entire gainfully employed population, which are tied together in economic relationships by a series of such wage differentials. This total supply of labor is affected by (1) changes in population; (2) modification in customs, living standards, and legislation; and (3) education and similar factors influencing personal efficiency.

Population Changes. The total number of people within the age groups that are available for gainful employment will be affected, with the passing years, by changes in the general trend of growth or decline in the total population. With a growing population, more adult men and women of working age are available for employment; with a declining population, fewer and fewer would be available as time went on. The Black Death in the fourteenth century is an historical example of the effects on labor supply of a declining popula-

tion, although it was a sudden and drastic decline rather than a gradual one. The population of Ireland has been steadily declining since the middle of the nineteenth century. At some periods of American history, the extensive immigration of population of working age was an important factor in the augmentation of the total supply of labor.

Modifications in Social Customs, Living Standards, and Legislation. Changes in social customs, in customary living standards, and in legislation have in the past hundred years proved profoundly effective in changing conditions that influence the supply of human services. In certain directions, for example, social custom and legal prohibition have restricted or eliminated the labor of women and children and, to that extent, have restricted the proportion of the population eligible for employment. In other directions women have been admitted to occupational groups from which they were once excluded. All of these developments have had the effect of altering considerably the potential supplies of labor in different occupational groupings.

Education and Similar Factors Affecting Efficiency. From the standpoint of production the supply of any kind of labor service depends not only upon the number of people whose services are available for use at a given wage, and the average number of hours per day that they are prepared to work, but also upon the efficiency of the services rendered. Anything that will increase the capacity of the individual members of the group to render productive services will tend, proportionately, to affect the results that can be ob-

tained with the employment of a given number of laborers. The total supply of labor services of an efficient population differs from the total supply of labor services of an uneducated or inefficient population of the same size.

For example, the ability of textile manufacturers in different parts of the world to obtain laborers at widely varying money wages does not mean that equal productive services can be obtained in each locality by the employment of the same number of laborers. Money wages in southern textile centers in the United States, or for textile workers in Japan, are lower than money wages in New England. This does not mean that the price per unit of productive labor service in those sections differs as widely from the price per unit of productive service in the northern textile industry as would be indicated by a comparison of the unadjusted hourly or yearly wage rates. The general level of education in the community, the special aptitudes of particular groups, and many intangible social influences profoundly influence the effective labor supply available in response to the payment of any specific wage.

INTERDEPENDENCE OF DEMAND, SUPPLY, AND PRICE OF LABOR SERVICES

A final point that requires emphasis, with respect to both long-period and short-period supply of labor services, is the basic interdependence of the demand and the supply in an economic system based on roundabout production. The final objective of economic activity is the provision of desirable goods and services

for the satisfaction of human desires. A large part of the population whose wants and desires constitute the demand for consumers' goods depend, for their ability to purchase those desirable goods, upon the personal incomes obtained from the sale of their own services. Thus the supply of human services will reflect the willingness of people, as a whole, to exchange their services in return for income, as compared with the satisfactions that could be obtained from non-work alternatives.

Relation between Supply of Resources and Supply of Labor Services. If the entire population is seeking to gain a livelihood in an environment that is poorly furnished with natural resources and other durable productive agents, much human effort necessarily will be expended in the production of a comparatively small per capita income. Consequently, the prevailing level of incomes derived from the sale of personal services will be low. The comparatively high degree of urgency for material goods and services will, in such a country as China, be reflected in long hours of labor for comparatively small returns.

On the other hand, if the community's endowments of natural resources and other accumulated durable agents are large, the higher level of production of desirable goods and services will mean a higher level of per capita incomes. Therefore, a greater proportionate valuation can be placed upon the satisfactions to be obtained from the expenditure of leisure time. Thus, it may be said that the higher the level of real wages or incomes in a country, the less the likelihood that

higher wages in general would evoke substantial increases in the available quantities of labor services, and the greater the likelihood that increased individual earnings on the part of the heads of families would lead to reduced employment of women, children, and the aged.

RENTS AND THE SUPPLY OF DURABLE AGENTS

In considering the supply conditions surrounding the use of indirect agents of production it is convenient, for certain purposes, to distinguish between natural resources and other forms of durable plant and equipment. This follows as a consequence of the unequal degrees in which the supplies of different types of agents can be adjusted, over long periods of time, to the trends in the demands of consumers.

To a considerable extent the existing stocks of natural resources are fixed quantities. New sources of supply of important materials may be discovered from time to time, however, and methods may be developed for using materials that previously lay outside the realm of economic utilization. It is also possible, with the passage of time, to apply human effort and ingenuity to the remolding of the physical environment. Natural advantages may be improved, natural handicaps offset by the work of men's hands. It should not be assumed that natural endowments are fixed and unchanging for all ages to come.

Yet, in general, a greater degree of flexibility of adjustment to changing demands is to be found in the case of buildings, machinery, and similar durable agents that are capable of duplication. When additional facilities of this sort are constructed, they may be, and commonly are, better than the old in technical efficiency. For example, the increasing demands for steel may be met by the construction of additional mills, but there is no way at the disposal of the industry of increasing the reserves of iron ore of a given quality. Metallurgical advance may develop methods of using deposits of iron ore that were formerly unworkable, but seldom do they increase thereby the available reserve stocks of the best qualities of the mineral resource.

This distinction between irreplaceable natural resources and other forms of durable plant and equipment as agents of production is significant only in the analysis of dynamic conditions of supply. In the short-period situation virtually all classes of durable agents of production are fixed in quantity.

SHORT-PERIOD SUPPLY

Although the stock of durable agents in existence is incapable of marked variation within any short period of time, this does not necessarily mean that the short-period supply curve for the use of such agents is completely inelastic. Such a supply curve would mean that, no matter how high or low the rents might be, the quantity of use available for production would be unchanged. In most cases there is reason to believe that the short-period supply curve would have some positive

slope, or elasticity, so that changes in the rent, other things being equal, would evoke some change in the quantity of agents offered for use at any given time. The following sections will discuss the circumstances that would tend to give such a positive slope to the short-period supply curves of different types of agents.

The Rents of Natural Resources. Where natural resources are scarce, people appropriate them for the sake of the income, or rent, that can be derived from their use. As explained in the preceding chapter, this rent will reflect the capacity of the agent in question to contribute to the value of the products into which it enters. It will also reflect the advantage to be obtained by using the grade of the agent in question as compared with other grades of poorer quality.

At any given time the individual owner of a durable natural agent, whether it be farming land, coal deposits, timber reserves, a power site, or a busy city corner, must use or sell the use of the agent if he is to obtain any income from it at the time. At what price will he be willing to sell the use of his property? If he elects to use it himself in his own business, how much will he attribute to it as the "cost" of its use? At what price will the use of equivalent agents be made available in the general market, if a general market for such uses exists?

Suppose that a certain type of agent were perfectly durable, involved no expense whatsoever for maintenance or provision for ultimate replacement, and that all other expenses connected with its use were assumed by the purchaser of the use. Then the owner

would be in the position of a firm that had no variable costs whatever. Suppose also that the ownership of this particular type and quality of agent was widespread (as is, for example, the ownership of agricultural land). Under such circumstances the supply curve of the individual firm would be absolutely inelastic, and the supply curve for the agent as a whole would also be absolutely inelastic. It would be advantageous to each individual owner to rent his property for any price greater than zero, rather than go without any income, although naturally the higher the rental actually received, the greater the advantage to the individual owner. In such a rare case, the rent or price of the current use is said to be completely dependent on the demand for the use. That is, no rational action on the part of the individual owner in question would influence the price of goods produced with the use of the agent.⁶

The case of a completely inelastic supply curve for the use of an agent, under conditions of pure competition among the owners of the agent, is illustrated graphically in Figure 25 on page 282. Assuming that the stock of agents, and therefore the quantity of potential uses, is fixed, the vertical market supply curve, *S*, indicates that no change in the quantity of use available would accompany a change in the rent obtainable for such use. The rent actually prevailing at any time would depend on the extent of demand, and is indicated by the

⁶ The owner might say that he would rather go without income than sell the use of his property for less than a certain sum, but if this involved the sacrifice of current income without offsetting advantage the action would be irrational.

point L , at the intersection of the market demand curve with the market supply curve.

If a certain type of agent or resource, on the other hand, were controlled by a single firm, or by a few firms under conditions approximating those of oligopoly,

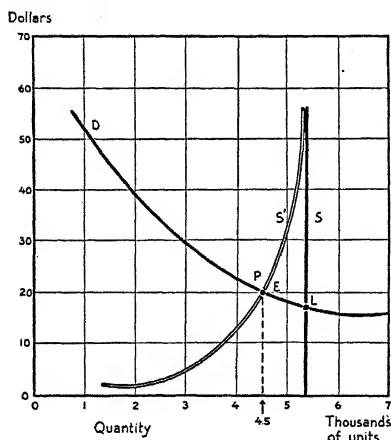


FIGURE 25. ADJUSTMENT IN THE SHORT PERIOD BETWEEN MARKET DEMAND FOR AND SUPPLY OF A DURABLE AGENT UNDER COMPETITIVE CONDITIONS

it would be advantageous to the owners to restrict the use of their property to whatever extent was necessary to maximize their total revenue. The upper limit to the rent that could be obtained for the use of an agent, under such circumstances, would be determined by the differential cost of producing the final product with the aid of substitute resources.

The situation that would prevail under conditions of monopoly in the ownership of the durable agent is illustrated graphically in Figure 26. With a market demand curve for the use of the agent as represented by the AR curve, the monopolist would maximize his revenue from the rent of his property by fixing the rent at the price indicated by the point P on the average revenue curve. At that price the marginal revenue ob-

tainable from the rent of the agent would be zero, as indicated by the point *E*. This is the adjustment that would prevail if the use of his property involved no cost

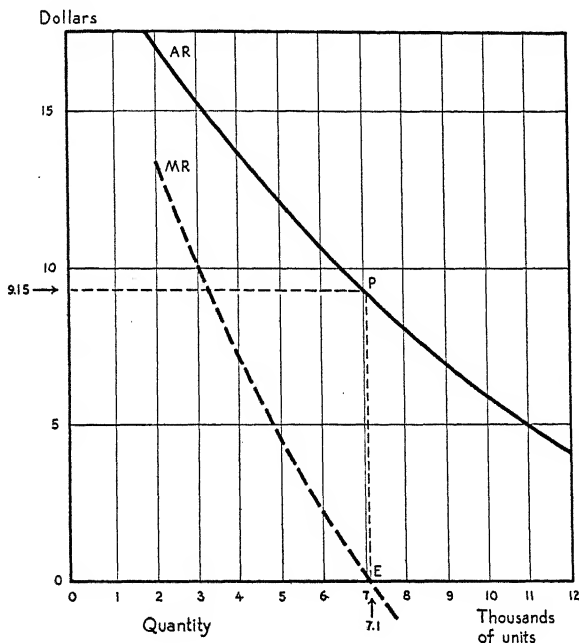


FIGURE 26. ADJUSTMENT IN THE SHORT PERIOD BETWEEN MARKET DEMAND FOR AND SUPPLY OF A DURABLE AGENT UNDER MONOPOLISTIC CONDITIONS

to the monopolistic owner. If it did involve cost, the price would be adjusted so as to make marginal revenue just equal to marginal cost.

Most economic agents are only relatively durable; their current use ordinarily involves wear and tear or

gradual destruction of the capacity to yield further use. In some cases, such as that of agricultural land, proper methods of tillage will permit the maintenance of fertility and usefulness for indefinite periods. The neglect of such methods, however, will lead to eventual exhaustion of productive capacity. Under such circumstances current outlays for maintenance must be made if the agent is to be truly durable. Such outlays may be regarded as the costs of current use; failure to meet them will lead to an eventual loss of earning power on the part of the agent.

If the outlays for maintenance would have to be made whether or not the agent were used, they are a part of overhead cost. If they would be unnecessary when the agent was not used, they are, properly speaking, elements of variable cost. Presumably no owner of such an agent would be willing to permit its use in return for a rent that was insufficient to repay the variable cost of current use, because to do so would be to sacrifice a part of the income that could be obtained in the future if the agent were preserved in unimpaired condition. Various owners might, however, differ considerably in their present valuations of the future revenues that could be obtained from the agent. Moreover, those who had the most pressing demands for immediate incomes would be inclined to sacrifice some part of their future prospects in order to obtain present incomes.⁷ They would therefore be willing to rent agents that they owned at a lower price than other

⁷ They would, under such circumstances, underestimate the full variable cost of producing the current income, and to that extent they would borrow from the future.

owners of agents of the same quality were willing to accept. Thus, the supply curve for the use of such agents would be positively sloped. Many examples of this situation are to be found in the utilization of farm land, and in the exploitation of timber reserves or coal lands.

Such a positively sloped market supply curve is illustrated graphically by the curve S' in Figure 25 on page 282. The prevailing rent is represented by the intersection of the market demand curve and this supply curve at the point marked P .

Other Durable Agents. If durable facilities or machinery were owned by someone other than the firm using them in production, the conditions of supply might vary from those of pure competition to those of pure monopoly. In a short period, within which the existing quantity of facilities could not be expanded, the situation under conditions of pure competition would resemble that already discussed in connection with natural resources. The demand curve would tend to have a positive slope, different owners being willing to permit the use of their facilities on different terms. Their respective minimum terms would depend, in each instance, upon the variable costs entailed by present use, and upon their estimates of the extent to which possible future revenues would be impaired if full provision for maintenance were not made.⁸

⁸ If durable agents are owned by the firm using them, the implicit rent to be allowed for their use is, of course, a question internal to the firm. Such implicit rents, however, would bear the same relationship to the current use of the agents as though the agents were owned by someone else. An agent would not be retired from use and left idle, so long as its use in production would make possible an expansion in output at a marginal cost less than marginal revenue. Thus, as long as any addition to net revenue could be obtained by the use of an agent, it would continue to be used.

Under conditions of monopoly or oligopoly, the quantity of facilities available for use would reflect the efforts of the monopolist or the oligopolists to maximize their revenues. Fear of spoiling the market, and similar influences already considered in dealing with oligopoly, might serve to prevent the owners from offering their property at lower rents, even though temporarily enhanced revenues might be obtained by so doing. In other words, a part of the agents so controlled would be withdrawn from use, if the demand for the use of the agent declined, although they would be in demand at a lower rent.

*SUPPLY OF DURABLE AGENTS IN PERIODS
OF ECONOMIC CHANGE*

During periods of rapid change in economic conditions, shifts in supply, as well as shifts in demand, are likely to affect the utilization of natural resources and other durable agents. For the most part the shifts in supply, within the comparatively short period covered by any phase of the business cycle, are unlikely to be very great, especially in comparison with the shifts in demand occurring in such periods. Nevertheless, some adjustment is likely to occur, its extent depending on the rate at which additions can be made to durable facilities, and also upon the rate at which existing facilities wear out or become obsolete. The actual changes in the rents of different types of agents, during successive phases of the business cycle, will be greatly affected by the conditions under which the agents are owned and controlled.

In a period of declining business activity, a certain amount of shifting in the supply curve for the use of a given type of agent is likely to occur under conditions of pure competition among the owners of such agents. Where some costs are involved in the current use of an agent, the decline in business activity is likely to be reflected in some positive shifting of the supply curve. Such a positive shift is indicated by the S'' curve in Figure 27 on page 288, as compared with the S' curve.

Such a positive shift in the supply curve, in the face of adverse business conditions, would tend to occur for two reasons. In the first place, the decline of prices of labor, materials, and supplies would tend to reduce any variable cost involved in the current use of an agent, and hence lead the owners to accept lower rents for the use of their property, rather than to have it remain unused. In the second place, the change in general business conditions would tend to increase the number of people having an urgent demand for present income. There would, therefore, be a somewhat larger number of people who would be willing to accept current rentals insufficient to provide for the full maintenance of the agent in condition to yield undiminished future incomes. This point has already been discussed in the section on the short-period supply situation, and does not require further elaboration here.

If the business decline were long continued the tendency toward a positive shift of supply would eventually be offset in greater or lesser degree by the gradual reduction in the number of agents available for use. As agents wore out and were not replaced, or

as their usefulness declined because of undermaintenance, the supply curve for the use of such agents would be shifted negatively. Whether the influences tending

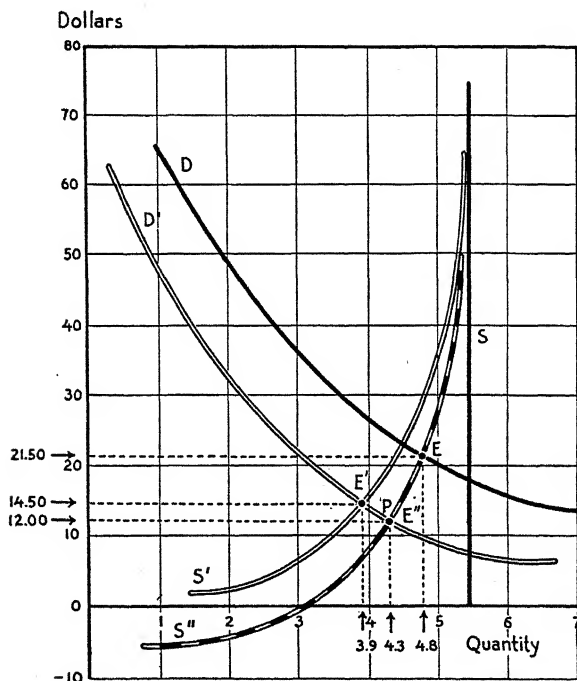


FIGURE 27. ADJUSTMENT OF SHORT-PERIOD SUPPLY OF A DURABLE AGENT TO A NEGATIVE SHIFT IN THE MARKET DEMAND CURVE UNDER COMPETITIVE CONDITIONS

to produce negative shifting would outweigh those tending to produce positive shifting would depend upon the circumstances of the time.

Thus far the effects of changes in business conditions have been considered on the assumption that a decline in business activity was in progress. When business activity increases, on the other hand, the adjustments described above would tend to operate in reverse order. Increased variable cost of current operation would produce some negative shift in the supply curve, but this would tend to be offset by the positive shift resulting from new construction of durable facilities.

Under conditions of oligopoly, however, there is probably less likelihood that current rents would be permitted to fall, in periods of economic distress, to as low a level as they might under conditions of pure competition. Considerable resistance is usually offered by the owners of shoe machinery, houses, or apartments, for example, to the reduction of rents in periods of depression, and many properties stand idle because no one can be found who will pay the rent required by the owner. The same thing is true of durable plant and equipment owned by concerns producing goods under conditions of oligopoly or monopolistic competition. Higher total revenues might be gained temporarily by reducing the price of their finished product, but the oligopolistic producers fear that such action might spoil the market. They prefer to allow facilities to go unused, rather than to use them at rents that might upset market relationships with other firms offering similar commodities, or that might encourage the belief that their product could be sold at a lower price.

The situation under monopolistic conditions is illustrated graphically in Figure 28. Here it is assumed

that a single monopolistic firm controls the type of agent in question, and that no variable cost is involved in the current use of these agents. The change in the

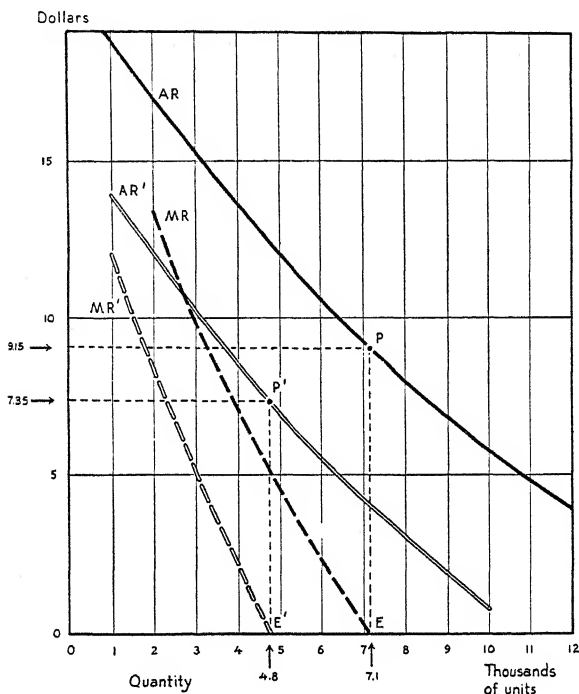


FIGURE 28. ADJUSTMENT OF A MONOPOLISTIC FIRM IN THE SHORT PERIOD TO A NEGATIVE SHIFT IN THE DEMAND FOR A DURABLE AGENT

conditions of demand is represented by the position of the AR' and MR' curves as compared with the AR and MR curves. Before the negative shift of demand occurred, the monopolist would have maximized his

revenues from the rent of his property by fixing the rent at \$9.15, indicated by the point *P* on the *AR* curve. At this price, marginal revenue would be equal to zero, as is indicated by point *E*. After the shift, his revenue would be maximized by fixing the rent at \$7.35, indicated by the point *P'* on the average revenue curve, *AR'*. At this price his current marginal revenue, *MR'*, would be equal to zero, as indicated by the point *E'*. Under conditions of oligopoly or monopolistic competition the rent would also be determined in accordance with the principles already discussed in earlier chapters.

THE DYNAMIC ADJUSTMENT OF SUPPLY OF DURABLE AGENTS

In the long run there are marked differences, from one type of agent to another, in the degree to which more or fewer facilities would be offered for use, in response to a higher or lower level of rents. Where the duplication of existing facilities is possible, the effect of a progressive increase in the demand for their use would be to encourage new construction, so long as the prevailing and prospective rent was sufficient to compensate the necessary investment.

Successive additions to facilities would have the effect of shifting the short-period supply curve progressively to the right. Such a shift, from year to year, would mean that a larger and larger number of agents of a given kind would be available for use at a given rent. If such facilities could be produced at long-run constant costs, their long-period supply would be completely elastic. Commonly, however, the duplication of such facilities

eventually encounters limitations that necessitate increasing outlays for construction. In the long period, therefore, their supply will be expanded under conditions of increasing cost to firms engaged in producing these facilities. The consequent long-period equilibrium adjustment between demand, supply, and price would occur at higher rents if the demand for the use continued to increase.⁹

Turning from durable agents that are capable of duplication to natural agents, or to durable construction that cannot be duplicated to equally good advantage (as, for example, urban real estate, railroad roadbed, canals, or bridges), it is clear that the long-period effect of an increase in the demand for the use of any such agents or resources will be to compel resort to those of inferior location or quality. Technological advance may offset, or more than offset, the effects of this resort to agents or resources of inferior quality, but this will not necessarily reduce the disparity in quality between the best and the poorest agents. It is always advantageous to make the first and most intensive use of those qualities that are best, having resort only as necessary to those qualities that can be used only to lesser advantage, or at higher cost per unit of product.

In some instances, of course, technological advance may bring into the supply available for use new agents that replace those formerly rated as highest grade. For example, the development of new transportation fa-

⁹ Decreasing long-period cost in the construction of such agents, resulting from technological advance, would tend to reduce rents that they could command. On constant, increasing, and decreasing cost to the firm, see above, Chapter IX.

cilities, resulting in low transportation rates, will open up new sources of raw materials possibly richer than those formerly in use. As a consequence of the discovery of new technical methods of handling low-grade gold ore, areas of the South African gold fields came to outrank the scattered but richer veins of gold in mountainous sections of North America. Furthermore, the development of new industries may, and indeed commonly does, change the quality rating of such facilities as urban land sites, agricultural land, manufacturing plants, and railroads.

Considering any particular quality or grade of a nonreproducible agent, however, an increased rent, over a long period, would have no effect on the quantity of agents of that grade available for use. If the available resources of agents of the grade in question were controlled by a few owners, under conditions of oligopoly or monopolistic competition, the actual level of rentals fixed would be set, in the long period, at whatever level would maximize the returns to the owners, taking into account the demand and the possibilities of substitution.

If the demand were not sufficient to involve resort to a substitute quality, it might be to the advantage of a monopolist, or an oligopolistic group of owners, to maintain a higher rent than would prevail under conditions of pure competition among the owners. The rent would, under conditions of monopoly, be fixed at whatever level would maximize the net revenues of the owner, and the extent of use would be restricted accordingly. Under conditions of oligopoly the rent

would tend to fall at some point between that fixed by a monopolist and that prevailing under competitive conditions. The impossibility of duplicating the better qualities of resources or durable facilities would be an essential condition to the maintenance of monopolistic or oligopolistic rentals over a long period. Otherwise the excessive rents of the monopolist or oligopolists would eventually be eliminated as a consequence of a progressive expansion in the available supply.

CHAPTER XII

Capitalization

INDIVIDUAL VALUATION OF DURABLE AGENTS

VALUATION OF DURABLE AGENTS RELATED TO THEIR RENTS

THE preceding chapter developed the point that whether a durable agent of production was owned by the firm using it or was leased from someone else, the value attaching to the use of the agent for a given period of time could be regarded as a rent. It was also shown that the amount of the rent payable for the use of such an agent during a stipulated period depended both on the demand for its use and on the number of agents that were available for use. It was suggested also that the number of agents would be affected by variations in the rents obtainable from their use. The response of supply to a higher or lower rent would be

greatest in the case of agents that were capable of duplication, and negligible in the case of those incapable of duplication.

The present chapter will be concerned with the further analysis of the relationship between the rent paid for the use of an agent and the price attaching to the agent itself. The chief problems that arise in this connection are problems of time valuation. They arise because the uses of a durable good are not all available at once, but are spread over a period of time, and must be waited for. Inasmuch as the use of an agent in the far distant future is not the same thing as the use of it today or tomorrow, the timeliness of use becomes a factor in the situation. The problems of time valuation will be considered primarily with reference to the factors affecting the demand, supply, and price of durable agents of production. The same principles apply, however, to the valuation of durable consumers' goods and to the alternative storage or use of consumable goods that are capable of preservation for future use. Wherever present transactions involve the purchase and sale of the right to the use of goods some time in the future, an element of time valuation becomes involved in the prices at which such goods are bought and sold.

TIME PREFERENCE AND TIME DISCOUNT

A person or firm considering the purchase of a durable agent has to determine how much the prospective series of rents obtainable from its use is worth now, because only on that basis can he decide whether

or not the investment necessary to obtain the agent is worth while.¹

The basic fact is that future uses are, in general, valued less in the present than are present uses of the same sort. Other things being equal, people exhibit a general preference for present income, or present satisfactions, as compared with equal expected incomes or satisfactions in the future. The term "time preference" is used to describe this general preference of people for present use, present satisfactions, or present income, as compared with the promise of an equal future use, future satisfaction, or future income.² There are occasional exceptions to this rule, in which the future is preferred over the present. Such preferences for future as compared with present use ordinarily arise out of differences in the circumstances surrounding the present and the expected future use. Many examples of preference for the future use of goods—as for ice in the coming summer as compared with present winter, or for theater tickets on some future night rather than tonight—result from differences in seasonal requirements or in convenience of personal arrangements. These differences in circumstance make the uses of apparently similar goods actually nonhomogeneous.

¹ The cost aspect of the problem will be dealt with subsequently. This does not mean that all choices with respect to the exchange of durable goods, either direct or indirect, actually rest on close calculations. Choices may be affected by habit, impulse, or prejudice. Nevertheless the choices that are made will reflect an attitude of relative willingness or unwillingness to wait for future, as compared with more immediate, incomes.

² For a thorough discussion of this subject see Fetter, F. A., *Economic Principles*, Chapters 20-21; and by the same author, "Interest Theory and Price Movements", *American Economic Review*, Supplement. Vol. XVII (1927), pp. 62-105.

But if there is no reason to suppose that there will be marked differences in "wants and provision for wants" in the future as compared with the present, the uses more remote in time will weigh less, in present importance, than similar uses not as remote in time. The uses nearer at hand will be valued more highly than those more remote in the future, simply because it will not be necessary to wait so long to obtain them. One would rarely consent to give up the use of his automobile in return for the promise of the use of an equally good vehicle next year, or five years hence, without some compensation for doing without one in the meantime. Nor would he look upon the offer of a sum of \$100 ten years hence as the full equivalent of a sum of \$100 in hand at the present moment. The more remote uses are *discounted* more heavily than those that are less remote.

PRESENT WORTH AS A CAPITALIZATION OF FUTURE RENTS OR INCOMES

Inasmuch as the rents of durable agents cannot be obtained before the uses for which they are payable have been rendered, the value of a durable agent cannot be determined simply by multiplying the monthly or annual rent by the number of years for which it is expected to continue. Instead, the present value of the agent will equal the sum of its *discounted* future rents, the rents obtainable in the more and more distant future being discounted in progressively greater degree.

The process of estimating the *present worth* of a series

of future incomes or rents is known as *capitalization*. Thus, the present valuation placed by an individual upon a durable agent represents his capitalization of its future earning power. This estimated present worth will indicate the amount he would be willing to pay for the ownership of the agent in question. In buying a durable agent, the purchaser exchanges purchasing power, with which he could buy goods affording present uses, for a good whose uses are virtually all situated in the more or less distant future. He gives a lump sum of present purchasing power for the ownership of a durable good whose use in the future will enable him to obtain future purchasing power in the form of rents.

A RATE OF TIME DISCOUNT REVEALED IN CAPITALIZATION

If an individual's present valuation of a durable agent is compared with the annual rents that it will afford, this comparison can be expressed in terms of the rate of time discount at which the future rents are capitalized.³

Suppose, for example, that a water-power site could be used for the generation of electric power, affording a saving of \$1,000 a year as compared with the cost of generating an equal amount of power by the use of steam. To all intents and purposes this water-power site would have a prospective earning capacity of \$1,000 per year for an infinite number of years, assuming no

³ Assuming, of course, that the period of time for which the rents will continue is known.

change in technical methods. If, at the present time, every year's use, no matter how distant, were assigned a present valuation of \$1,000, the capitalized value, or present worth, of the site would be infinite. In fact, however, the present worth of the site would be very much less than an infinite sum, simply because a saving of \$1,000 one hundred years hence, or even at a less remote time, means very little to anyone now living. The present worth to any individual would depend on the steepness of the rate at which he discounted (or deducted from) the future rents obtainable from successively more and more distant periods of use. The higher the rate at which future rents are discounted, the smaller will be the present worth of any future rent, and the smaller will be the present valuation of all the future rents taken together. Thus, the capitalization of the prospective rents of a durable agent, or its present worth, will vary from one person to another, depending on the rate of time discount involved in the valuations of each.

The rate of time discount involved in the purchase and sale of durable agents may be expressed in another way. Suppose that a prospective purchaser of the water-power site described above offered the owner \$20,000 for it, and that a competitor offered \$25,000. Assuming that each of the bidders could obtain the same savings in cost of power generation (\$1,000 per year) through its possession, it is clear that the two bids reveal different rates of discounting the prospective series of rents. In the first instance the annual saving or rent would amount to one twentieth of the purchase price,

(\$1,000 ÷ \$20,000), or a rate of return of five per cent on the investment.

The second offer would represent a rate of return of four per cent per year on the investment (\$1,000 ÷ \$25,000). The second bidder's higher offer of present purchasing power in exchange for the given series of future rents indicates his willingness to wait longer for the annual rents to return the principal sum invested. This is clearly revealed if the relationship between the present worth of the agent, or the principal sum invested in it, and the annual rent is expressed in *years' purchase*; that is, in terms of the number of years required for the annual rent to equal the present worth. An offer of \$20,000 for an agent yielding a rent of \$1,000 a year would represent a twenty years' purchase, whereas an offer of \$25,000 for the same agent would represent a twenty-five years' purchase. The larger the sum offered for a given series of rents, the higher will be the number of years' purchase, and the longer the period of waiting before the principal is returned in income. This is the same as saying that the person making the larger present offer is discounting the future rents at a lower rate of discount.

It follows that wherever durable goods whose uses are capable of separate valuation are bought and sold, some rate of time discount is bound up in every offer to buy or sell, whether or not the traders consciously recognize the fact. A small shopkeeper may hesitate to purchase a delivery truck because he fears that it would "take too long to get his money back." Having estimated the net savings obtainable by operating his

own truck, as compared with hiring a delivery service, or the additional revenue that might be obtained by offering delivery service to his customers, he is in doubt whether the prospective savings or added revenue have a present worth equal to the price of the new vehicle. If his rate of time preference or time discount exceeds the rate of return that the use of the truck would yield on the investment necessary to obtain the truck, he will refrain from purchasing it.

DEMAND FOR DURABLE AGENTS

NEGATIVE SLOPE OF THE DEMAND CURVE

Effect of Variations in Individual Rates of Time Discount. The aggregate or market demand curve for a certain type of durable agent will tend to have a negative slope, at any given time, as a consequence of the different rates of time discount at which different individuals or firms may discount the prospective rents to which the ownership of such agents would entitle them. A few prospective buyers, who discount the future at a comparatively low rate, would be prepared to pay a high price for the durable agent rather than go without it. Others, who discount the future at a higher rate, would be prepared to buy only if the price were lower. At the lower price, therefore, the total quantity demanded would be larger than at a higher price.

Effect of Variations in Individual Estimates of Future Incomes. There is a second reason for the negative

slope of the demand curve for a durable agent in the short period. The present worth of a certain durable good may differ, for different people or firms, not only because of disparities in their respective rates of time discount, but also because the agent would yield dissimilar future incomes or rents to different people. In the preceding illustration of the water-power site, it was expressly assumed that the possession of the site would afford equal savings, or rents, to each prospective buyer. Under such circumstances differences in present worth would represent only differences in time discount.

In that case, however, and also in the case of the shopkeeper considering the purchase of a truck, differences in present valuation of the agent might arise because one person could utilize the agent to better advantage than could another person. If one bidder for the power site were confident that it could be made to afford a permanent annual rent of \$1,000, whereas his rival estimated the prospective rent at \$800, the first would estimate the present worth of the site at \$20,000, and the second at \$16,000, assuming that each discounted the future at a rate of five per cent.

The ability to use the agent so that its future rents will be larger may result either from some technological advantage possessed by the prospective buyer, or from his superior ability to operate it. Since such advantages of position or personal ability are scarce, there will be fewer individuals or firms attaching higher estimates than those attaching lower estimates to the possible

future annual rents. This source of inequality in present valuations contributes also to the negative slope of the short-period demand curve for durable agents.⁴

It is possible that two prospective buyers would attach the same present worth to a given agent, even though their estimates of the prospective future rents, and their rates of time discount, were different. If the first bidder estimated the rent obtainable from the site at \$1,000 per year, and discounted the future rents at five per cent, he would attach a present worth of \$20,000 to the site. A second bidder might estimate the future rent at \$800 annually, but if he discounted the future at the lower rate of four per cent, his present valuation of the site would also be \$20,000.

Thus, in summary, the present worth of any durable agent is based on two factors. The first is the magnitude of the prospective series of future rents, taking into account both the size of the annual rent and the period for which it will continue to be received. The second factor is the rate of time discount at which the prospective future rents are capitalized. Both of these factors influence the valuations of prospective purchasers of durable agents, and so contribute to the determination of the demand curve for such agents. Anything that tends to alter either the expectations of future returns on the part of the buyers, or the rates at which they discount future expectations, will to that extent alter the demand for durable agents.

⁴ This general statement is modified in effect, but not nullified, by errors in business judgment. The influence of alternate over-optimism and over-pessimism will be discussed in the chapter on the business cycle. See below, Chapter XVI.

SUPPLY OF DURABLE AGENTS

The previous chapter indicated the nature of the relationship between the demand for the use of indirect agents and the supply of the uses available, the prevailing rent reflecting the current adjustment of demand and supply. The preceding pages of this chapter have traced the connection between the rent of a durable agent and the demand for the possession of the agent itself. It has been seen that this demand for the agent exists because of the uses, and corresponding rents, obtainable from it. It remains to be seen how the conditions surrounding the supply of the durable agent will affect the number of such agents available for use and, therefore, the rents that they enable their owners to obtain.

Allowing sufficient time for adjustment, an equilibrium will tend to be established between the demand, supply, and price of durable agents, on the one hand, and the demand, supply, and rents paid for their uses, on the other. In order to complete the analysis of this equilibrium, it is necessary to sketch briefly the varying conditions surrounding the supply of durable agents.

If, at a given time, the rent attributable to the use of certain agents in production is high, in comparison with the price of these agents, it will be advantageous for producers of finished products to invest additional funds in the purchase of such agents for use in production. As a consequence of the strong demand for

these agents, existing under such circumstances, the price would tend to be bid up. This rise in the price of the agents would itself tend to restore equilibrium between the price of the agents and the rents of their uses. If the agents were capable of duplication, however, the relatively high price would also stimulate an increase in their production. As the total quantity of agents of this type available for use increased, the rent paid for the use of any one of them would decline, until equilibrium was once more established.

Conditions of Pure Competition. If a durable agent were being produced under conditions of pure competition, the quantity produced and offered in the market would tend to equal the quantity demanded at a price corresponding to the average and marginal cost of production. As long as the rents obtainable from the use of such durable agents were so high that their capitalized present worth was, in the estimation of large numbers of buyers, greater than the current price, there would be a strong demand for such agents.

Eventually the increasing number of agents in use would begin to depress the rents obtainable from them, and thus would reduce their capitalized present worth. An equilibrium position of demand, supply, and price would be attained when the annual volume of output of the durable agents was just sufficient to meet the annual demand⁵ at a price equal to average and marginal cost.

The average variable cost of producing the durable

⁵ Arising from the need for new units for replacement purposes, or to meet an upward trend in the demand for the final product.

agent would fix the lower limit of the price of such agents in the short period, and average cost would represent the longer period point of price equilibrium. In the long run, the rents attributable to a particular durable agent would have to be sufficient to enable the producers of such agents to purchase the necessary materials and other factors of production, in competition with the producers of other products requiring the use of such materials.

Conditions of Monopolistic Competition, Monopoly, or Oligopoly. The production of durable agents of production is probably more frequently characterized by conditions of monopoly, monopolistic competition, or oligopoly than by those of pure competition. The great bulk of machine tools, plant facilities of all kinds, transportation equipment, and the like, are the products of industries in which small numbers of firms are to be found.

Under such circumstances the demand curve for the agents produced by the individual manufacturer is not indefinitely elastic, and it is to the advantage of the firm to adjust its output in accordance with the general principles already described in earlier chapters. The firm will maximize its net revenue by producing that output at which marginal revenue equals marginal cost. If the firm possesses something approaching a pure monopoly, it may enjoy net receipts in excess of the average cost of producing the agents in question. Under conditions of monopolistic competition (with greater freedom of entry of new firms) the price of the agent may not exceed the average cost of the actual output,

yet still exceed the cost at which it would be produced if conditions more nearly approached those of pure competition.

Assuming that the equilibrium price of a durable agent produced under conditions of monopoly or monopolistic competition is higher than it would be if conditions of pure competition prevailed, the long-period equilibrium would entail a somewhat higher level of rents for such agents.⁶ This would necessarily be so, assuming no change in the rates of time discount on the part of the buyers, if the capitalized rents were to be sufficient to equal the higher price.

NONREPRODUCIBLE AGENTS

There remains to be considered, finally, the situation where durable agents are incapable of duplication. Such agents may be classified for convenience into those that, with suitable maintenance, may be preserved as permanently useful agents, and those that, while not subject to immediate exhaustion, nevertheless have an ultimate limit to their useful lives. Agricultural land, forest land, urban land, water-power sites, railroad right of way, canals, dams, and similar structures may be taken as examples of the first class. Mineral reserves constitute the most important example of the second group.

An increase in demand for the use of nonreproducible agents, as indicated in the previous chapter, will be reflected in an increase in the rents offered for such

⁶ This involves the further assumption that all possible economies of the firm could be achieved without monopoly.

use; and this increase in rents will not, as in the case of reproducible agents, result in any offsetting increase in the supply.⁷ The effect of the increase in the expected rents of any particular agent will be reflected in a corresponding increase in its price (assuming no change in the rates of time discount), because to any individual the ownership of the agent will represent the right to larger future incomes.

To the extent that a given kind of durable agent is subject to destructive use, the long-period supply of its use will depend upon the extent to which provision for repair or maintenance is made. If the prospective rents of the agent (and consequently its present worth) are low, little provision may be made for its preservation as a permanent source of productive services. As the present worth of the prospective future rental payments increases, greater expenditures for current maintenance and repair will be made in order to extend the period of useful life. Thus for such resources the long-period supply situation will be affected in some degree by the price of the agents. A higher price will lead to some increase in the consideration given to preserving their full productive power, and a lower price will evoke somewhat less effort to preserve them for permanent use.

In the case of exhaustible resources, an increase in the price of the product (whether it be coal, oil, lumber, or other minerals) will lead to an expansion of current

⁷ The increase in the rents attaching to the use of agents of any given kind and quality will, of course, be limited by the possibility of resorting to substitute methods and agents.

use and a more rapid rate of exhaustion. This will mean the shortening of the entire prospective series of rents. The reduced duration of the entire series will be more than offset, however, by the increased amount of the annual rental value of the reserves. This will reflect an increased element of rent per unit of product (and also the increased volume of output), so that the capitalized value or present worth of the entire series of rents will be larger, even though the series is shortened.

TIME DISCOUNT THROUGHOUT THE PRICE SYSTEM

In concluding this discussion of time discount and capitalization, it is desirable to emphasize the fact that the phenomena of time discount extend to every section of the price system. It has been convenient to discuss the subject in connection with the pricing of durable agents of production, but the same principles apply wherever people are faced with the necessity of evaluating future desires and future uses. Goods capable of use in the present are preserved, in part, for future use, because the present discounted estimates of certain future desires are sufficiently great to outweigh the pull of certain other desires that would be satisfied by present use.

For example, a part of the crops harvested in the fall is employed to serve the immediate demands for food, but the larger part is reserved for use in the months that intervene before the next harvest. A very

large amount of business activity is involved in the storage and preservation of present goods for future uses. This activity is possible because the price of the crop at the time of harvest is determined by the demand and supply conditions at that time, and because the demand, in large measure, represents the discounted present worth of consumer demands that will appear later in the year. In other words, the price of grain in the fall embodies in it an element of time discount that relates it to the prices that grain traders, warehousemen, millers, and others expect will prevail for flour and bread later in the year.

Neglecting unforeseen changes in conditions that may invalidate these estimates of the future, the difference between the price paid for the grain in the fall and the price obtained for it later in the year, at the time consumers are demanding bread, will afford a return on the investment of those engaged in storing the grain for the intervening months.

The same thing is true of all other kinds of goods, direct and indirect, that are capable of preservation to meet the later demands of consumers, or the subsequent demands of producers for raw materials and supplies. Thus, in general, the utilization of all resources, either directly or indirectly, in the satisfaction of human desires, is influenced by the factor of time discount. The value of such resources is affected by the period of time that must elapse before they finally contribute to the satisfaction of human desires. Where unequal lengths of time are involved in different productive processes into which a particular kind

of raw material or human service may enter, the demands of different producers for those materials or services will involve unequal elements of time discount.⁸ A change in supply, resulting in a change in price, will therefore effect a redistribution of the use of the particular agent in accordance with the varying urgency of the requirements of the different buyers.

A final point that should be noted is that, from the standpoint of the particular producer of a finished product, any method that he can devise to shorten the length of time involved in production, in comparison with the average period involved in its production by rival concerns, will represent a source of additional gain to himself. If his rivals are able to duplicate his achievement, the ultimate effect will be to reduce the element of time discount involved in the aggregate demand for the materials. This will bring about a readjustment in the demand for, and price of, the necessary materials and in the supply of the finished product.

MATHEMATICAL NOTES ON CAPITALIZATION

The arithmetic involved in the process of capitalization reveals some of the practical problems of the business man.

Growth of a Fund or Principal at Compound Interest.
A sum of \$100 put out at interest of four per cent will amount to \$104 in one year (that is, \$100 plus

⁸ These differences are reflected in the negative slope of the demand curve.

\$100 \times .04). In two years it will amount to \$108.16 (that is, \$104 plus \$104 \times .04). Following is a symbolic presentation of the growth of a principal at compound interest:

$$P, \quad P(1+r), \quad P(1+r)^2, \quad P(1+r)^3, \\ P(1+r)^4 \dots P(1+r)^n$$

In other words, for each year (or similar unit of time for compounding) there is an additional multiple of $(1+r)$ applied to the principal at the beginning of the period.

Present Worth of a Single Future Sum. Finding the present worth of a single future sum is the reverse of the above arithmetical process. Thus, given the size of a future sum and the year in which it is due; namely, given that $F = P(1+r)^n$, then

$$(1) \quad P = \frac{F_n}{(1+r)^n}$$

Present Worth of a Uniform Series of Future Sums. Any good that is absolutely durable (or can be made practically so by careful maintenance) will provide an infinite series of incomes. If such incomes accrue during each year and become payable in a uniform number of value units at the end of each year (say \$100 per year or \$ a per year), these could be represented by

$$a_1, \quad a_2, \quad a_3, \quad a_4, \dots a_n, \dots$$

In order to find the present worth of the good (or security) that yields this series of incomes it is possible simply to add the series of a 's, providing each one

of them is reduced by discount to its present worth. This can be done by applying the formula given above, so that the present worth of the whole series would be

$$P = \frac{a_1}{(1+r)} + \frac{a_2}{(1+r)^2} + \dots + \frac{a_n}{(1+r)^n} + \dots$$

Or, since the a 's are all equal,

$$P = \frac{a}{(1+r)} \left[1 + \frac{1}{(1+r)} + \frac{1}{(1+r)^2} + \dots \right]$$

the last factor being an infinite geometric series.

The sum of this series has the form $\frac{1}{1-v}$. Here

$$v = \frac{1}{1+r}. \text{ Hence } \frac{1}{1 - \frac{1}{1+r}} = \frac{1+r}{r}.$$

Therefore,

$$P = \frac{a}{1+r} \cdot \frac{1+r}{r} = \frac{a}{r}$$

$$(2) \qquad P = \frac{a}{r}$$

Present Worth of a Terminable Uniform Series of Future Sums. In order to find the present worth of a terminable series of uniform future sums, it is possible to use the formula numbered (1) above for each year and then add the resulting figures. Tables are available that give these present worths, assuming various rates of discount, for one dollar. Following is a part of such a table, showing the present worths of \$1, assuming rates of discount of 4%, 5%, and 6%, where the \$1 is due from 0 to 100 years hence.

TABLE SHOWING PRESENT WORTH OF \$1.00

due at the end of any year from 1 to 20 years and thereafter at decennial years to 100 years, at interest rates of 4, 5, and 6 per cent

YEARS ELAPSED	4%	5%	6%
0	1.00000	1.00000	1.00000
1	.96154	.95238	.94340
2	.92456	.90703	.89000
3	.88900	.86384	.83962
4	.85480	.82270	.79209
5	.82193	.78353	.74726
6	.79031	.74622	.70496
7	.75992	.71068	.66506
8	.73069	.67684	.62741
9	.70259	.64461	.59190
10	.67556	.61391	.55839
11	.64958	.58468	.52679
12	.62460	.55684	.49697
13	.60057	.53032	.46884
14	.57748	.50507	.44230
15	.55526	.48102	.41727
16	.53391	.45811	.39365
17	.51337	.43630	.37136
18	.49363	.41552	.35034
19	.47464	.39573	.33051
20	.45639	.37690	.31180
30	.30832	.23138	.17411
40	.20829	.14205	.09711
50	.14071	.08710	.05429
60	.09506	.05354	.03031
70	.06422	.03287	.01693
80	.04338	.02018	.00945
90	.02931	.01239	.00528
100	.01980	.00760	.00295

Each value in the table is equal to $\frac{\$1}{(1+r)^n}$ for specified values of r and n . For example,

$$\$.47464 = \frac{\$1}{(1+r)^n} \text{ when } r = 4\% \text{ and } n = 19 \text{ years.}$$

C H A P T E R X I I I

Interest and Investment

INVESTMENT AND PROPERTY INCOMES

RENTS OF DURABLE AGENTS AS FUNDAMENTAL SOURCES OF PERSONAL INCOMES

IN the preceding chapter the relationships of the demand, supply, and price of durable agents were considered primarily from the standpoint of the producer or business enterprise. It was seen that it is advantageous for a firm to acquire such agents and employ them as long as their prospective rents, when capitalized at the prevailing rate of time discount, are greater than, or just equal to, the prices that must be paid for them. Similarly, it is advantageous for the firm to retain ownership of such agents as long as their discounted prospective rents from use by the firm have an aggregate present worth that is equal to, or greater

than, the price that could be obtained for them if they were sold in the market.

Ownership and Property Incomes. In former times durable agents of production were, for the most part, directly owned by private individuals, and their rents constituted an important form of personal income. Landed estates, factories, the shops and tools of humble artisans, were all personal possessions and sources of direct, personal incomes. This is still very largely true in the case of agricultural land, buildings, and machinery, of commercial real estate and housing in the smaller towns and cities, and of the facilities for certain types of trade.

Growth of Intangible Property Ownership. In most branches of modern industry, however, the corporate form of organization has become predominant. With its development a large proportion of the durable means of production have come to be owned, not by private individuals directly, but by corporations. Corporations, in turn, issue securities, or *intangible* property, which are owned by individuals.¹ When durable agents are owned by a corporation, the individual derives an income, not from the ownership of the agents themselves, but from the ownership of the securities issued by the corporation.

The individual who wishes to exchange present funds for future income has two chief alternatives open

¹ Legally, the corporation is a business entity, or "person", distinct from the people who at any time are its owners. For a more detailed discussion of the corporation, and the rights and privileges of the owners (stockholders) see Modlin, G. M., and McIsaac, A. M., *Social Control of Industry*.

to him. He may, if he wishes, purchase shares of stock in a business corporation. In that case he becomes a stockholder, or part owner, of the corporation, to which, in turn, the actual agents of production belong. Or, if he prefers, he may invest his funds in bonds, mortgages, notes, or other credit instruments, by means of which business firms borrow funds to finance their activities. If he elects this latter alternative he becomes a *creditor*. In this case he also becomes an owner of intangible property, but he is not considered to have a share of ownership of the business.² He simply owns a legal contractual claim against that business for the amount of the sum loaned, plus the interest agreed upon.

If a person chooses to invest funds at his disposal in the stocks of a business corporation (or in a partnership, or an individual business venture of his own) he may be described as an *active* capitalist or investor. If he chooses instead to invest in bonds, mortgages, notes, or other modes of lending funds, he is a *passive* capitalist or investor. The income received by the capitalist, whether active or passive, is property income. Traditionally the income received by the owners of a business has been termed "profit", although with

² Whether the individual prefers to become a stockholder, or elects instead to become a creditor, what he actually possesses, in either case, is an intangible property right, representing his claim to a share of the earnings of the business. The individual stockholder in a railroad company or bus line, for example, cannot identify any particular locomotive or bus as his own property. What he owns is a proportionate share of the entire undertaking. The individual bondholder likewise cannot identify any part of the physical property of the business as his, although certain portions of the property may be pledged by the borrowing company as security for the ultimate payment of the sum borrowed.

the development of the corporate form of business enterprise the sums actually paid to the stockholders are usually referred to as "dividends."³ The income received by the bondholder, mortgage holder, or other passive investor is ordinarily referred to as "interest."

Nature of Capital and Investment. The term "capital" is used to describe the value attached to property ownership; it represents the present worth of property rights to income. The amount of capital represented by the ownership of a durable agent, or of intangible property, corresponds to the amount of present purchasing power or *funds*⁴ invested in those durable agents or in intangible property. When the individual has once invested current funds at his disposal, either in durable agents or in intangible property rights, the amount of his capital corresponds to the current value of that property, regardless of the amount that he originally invested. Suppose, for example, that a man bought a share of stock in 1928 paying \$175 for it, but that it subsequently declined in value to \$75. At the later date his capital would be, not \$175, the amount originally invested, but \$75, representing the amount of present purchasing power or other present goods for which he could exchange his ownership claim.

So long as an investor continues to hold his securities he is, in effect, indicating his continued willingness to forego the use of present goods and services (to an

³ Current dividends will, of course, differ from current profit by the amount of the latter that is reinvested in the business and thus not paid out to stockholders.

⁴ Hereafter, in order to avoid the cumbersome phrase "amount of present purchasing power", the term "funds" will be used as a synonym. Thus, "funds" may be spent for consumption, or they may be invested.

amount equal to the capital value of his securities), in exchange for the future income to which those securities entitle him. As changing business conditions alter the value of his securities in terms of other goods and services, the amount of capital that he supplies to industry may be conceived of as changing accordingly. Nevertheless, so long as he continues to hold his securities, that fact indicates that he prefers the income to be obtained through ownership to the present goods and services that could be obtained in exchange for his invested capital.

Nature of the Total Demand for, and Supply of, Capital. In the analysis of the demand for, and the supply of, capital in the aggregate, the term "demand" applies to the total quantities of capital that business firms would find it advantageous to employ in their undertakings, at a given time, provided the rate of interest were either higher or lower. Likewise the term "supply" applies to the total quantities of capital that would be invested or left invested in business undertakings, at a given time, if the rate of return were either higher or lower.

The supply of, and demand for, capital are therefore not to be considered as applying merely to the new requirements for funds, and the new offerings of funds, that appear from year to year when industry is expanding, any more than the supply of, and demand for, labor are considered to apply only to employers seeking to hire additional men, and unemployed laborers seeking work. The fact that a particular business firm is not expanding its plant and

equipment by selling stock or issuing additional bonds does not alter the fact that it is demanding a certain quantity of capital, represented by its outstanding securities. Otherwise it would go into liquidation. Moreover, if the rate of interest were lower, it might seek additional capital, whereas if the rate were higher, it might not find as large an investment advantageous. These varying possibilities are reflected in the total demand curve for capital.

Relation of Borrowing to Proprietary Investment. At any given time the requirements of industry for capital will bear a definite relationship to the current demand for the possession and use of durable agents and other productive resources. A part of the funds used to acquire those goods and resources will have been obtained by the sale of ownership claims, or stocks, to individual investors. A part will have been obtained by borrowing on long-term securities. The proportions of the two types of intangible property rights in the hands of investors will depend, in considerable measure, upon the preferences of investors. It will also depend, in some measure, upon the exigencies of different industries; in some industries the earnings fluctuate so greatly from year to year that any substantial measure of long-term borrowing would be unsafe; in other industries, notably the railroads and public utilities, a substantial part of the total investment is in the form of long-term loans.

In the following sections of this chapter the market for long-term loans will be distinguished from the market for securities representing ownership, for the

purpose of tracing the interplay of the forces of supply and demand that affect the interest rate and the rate of return on proprietary shares. The two markets are, of course, very closely related to each other, just as are the markets for two easily substitutable goods. When due allowance is made for differences in risk and uncertainty, the return obtainable from one form of investment cannot diverge, over any considerable period of time, from the return obtainable from other forms, without setting up compensatory reactions. In shorter periods, however, interest rates and earnings on stocks may shift considerably with reference to each other, as changing business conditions affect different types of investment in varying degree. These changes tend to produce shifts by investors from one type of investment to the other, which considerably alter the conditions prevailing in the two markets. The nature of these shifts, and of the adjustments that determine the rate of return prevailing in either market at any time, will be described chiefly in connection with the market for long-term loans.

PASSIVE INVESTMENT AND INTEREST

RELATION OF BORROWING TO PRODUCTIVE ACTIVITY

It is almost a truism that productive activity could not be continued (on more than a hand-to-mouth basis) if no one were willing to invest funds, representing present labor, present raw materials, and other

present goods, in the construction and maintenance of indirect agents of production. Certain natural agents and forces exist, it is true, independently of any effort or foresight on the part of men, but unaided nature provides no more than the foundation on which has been erected the superstructure of modern industry.

In its barest essentials production depends upon the willingness of people to permit resources that are under their control to be devoted to present productive activities. This willingness is based on the expectation that the products resulting from those activities, when completed, will be of sufficient value to remunerate the owners for the use of their property, and to compensate them for the period of waiting that is necessary before their income is received. An economic system is conceivable, however, in which every man would engage in production for himself, employing his own labor and whatever resources he might have at his own disposal. During the Middle Ages handicraft industry very largely exemplified just such a situation. The total output of desirable goods and services is, however, severely restricted under such conditions. There is no certainty that those best adapted by skill and temperament for a particular type of production will have at their disposal the necessary materials, supplies, and facilities to attain the most efficient scale of output.

During the Middle Ages, many expedients were developed to circumvent the ban on usury and make it possible for one producer to borrow funds with which to buy materials, facilities, and other indirect agents that would enable him to produce more effectively.

Since that time production has been conducted increasingly with the aid of borrowed funds. Capable business organizers are not limited in their ability to initiate productive undertakings by the amount of their own funds available for investment. So long as they are able to inspire confidence in their integrity and ability, and in the soundness of the ventures upon which they are embarking, they may obtain additional funds by borrowing from other people. Presumably the lenders will be persons or firms who have funds at their disposal but are not as well prepared to employ them productively in enterprises of their own.

MAJOR TYPES OF BORROWING

In the modern economic system, borrowing by business enterprises takes two principal forms. The first is long-term borrowing, chiefly for the purpose of constructing or buying durable plant and equipment. The second is short-term borrowing, in order to finance the purchase of raw materials, supplies, and labor, with the expectation that the sale of the finished product will provide funds for the repayment, with interest, of the short-term loans. A detailed discussion of short-term borrowing and lending activities would require a full description of the operations of commercial banks that is beyond the scope of the present book.⁵ The present analysis is confined to long-term investment, either in the form of loans to business enterprise, or

⁵ Such a description is included in Luthringer, G. F., Chandler, L. V., and Cline, D. C., *Money, Credit, and Finance*.

in the form of purchases of corporate stocks. The market for long-term loans will be considered first.

ORGANIZATION OF THE MARKET FOR LONG-TERM LOANS

Conditions of Demand and Supply. As a preliminary to the discussion of the rate of interest prevailing on long-term loans, it is desirable to review briefly the predominant characteristics of the market for such loans. The demand for long-term loans represents, in the aggregate, the individual demands of large numbers of business firms of every kind, ranging from the small retail establishment, garage, or farm to the large trunk-line railroad, steel producer, automobile manufacturer, or oil refiner. As a consequence, the demand side of the market is characterized, as a whole, by conditions approaching pure competition among the borrowers. Only occasionally is any variation in the size of a single business enterprise likely to make a significant difference in the total requirements for long-term funds.

Substantially similar conditions prevail among the ultimate investors from whom the funds for long-term investment are obtained. Even though individuals vary in the extent of their investments, from the small clerk with a few dollars in the savings bank to the great capitalist with holdings running into the hundreds of millions of dollars, any change in the investments of any single individual would have a relatively small effect on the total supply of present invested funds.

Functions of Financial Intermediaries. It should be noted, however, that in modern times an increasingly complex system of financial institutions has grown up that serves in an intermediary capacity in transactions involving long-term investments. Certain financial institutions, such as the great investment banking houses, specialize in the financing of new loans to large business enterprises, or in the refinancing of outstanding loans that are nearing maturity. These banking houses assume the responsibility of seeing that the new securities (or those to be issued in exchange for existing issues) find their way into the hands of ultimate investors. Some such service is virtually essential when large amounts of new securities are being issued, because the ultimate borrower is not in a position readily to establish contact with investors scattered over the entire country.

Quite apart from transactions involving changes in the total amount of securities outstanding, many transfers of ownership of existing securities are constantly occurring, as individual investors seek to increase their individual holdings, or to decrease them, according to the exigencies of their own personal affairs. In order to facilitate such transfers of ownership among individual investors, other specialized financial institutions have developed, of which the outstanding examples are the great stock exchanges, brokerage houses, and the like.

Finally, there are financial institutions that specialize in the performance of fiduciary functions, among which the most important are the life, fire, and casualty in-

surance companies, investment trusts, trust companies, and savings banks. These institutions differ from the investment banking houses in that they serve as permanent holders of the securities issued by the borrowers, obtaining the funds with which to purchase these securities for the most part from the small accumulations of many scattered investors. The fiduciary institution stands in the position of an intermediary in investing the aggregate sums collected from the small investors. It receives the interest paid by the ultimate borrower, and distributes the sums so received among the individual investors whom it represents.

Influence of Monopolistic Competition among Intermediaries. In performing their intermediary functions, the investment banking houses and other financial institutions are very likely to find themselves operating under conditions of oligopoly or monopolistic competition in their relation to the firms seeking to borrow, and under conditions of oligopsony or monopsonistic competition with respect to the ultimate investors. Where such a situation prevails, the rate at which individual business firms are able to borrow and the rate of interest received by the ultimate investor may diverge to some appreciable degree. The difference will represent the charge made by the financial middlemen for their services and will, presumably, be so fixed as to afford the maximum return to them.

The existence of small numbers of intermediaries will not, of course, affect the demand for, or the supply of, funds for long-term loans; but it may affect the

total amount of such investment by influencing the rate of interest actually paid by borrowers and that received by lenders. The financial institutions are also able, by virtue of their position in the investment market, to exercise a profound influence on the development of particular industries, and have contributed significantly to the concentration of the control of industry in the hands of a comparatively small number of people.

THE DEMAND FOR LONG-TERM LOANS

Demand for Loans Derived from Demand for Productive Facilities. The total demand for long-term loans at any time stands in a definite relationship to the total demand for the present possession and control of durable goods. To obtain present productive goods, the enterprisers require present funds. To the extent that they do not themselves possess sufficient present funds they will appear as potential borrowers on the demand side of the market for long-term loans. By obtaining the control of the agents in question, the producers will obtain the rents or implicit rents that will accrue as the agents are used in productive activity. The accrual of these rents with the passage of time, as uses now future become present, will enable the payment of the interest on funds that were borrowed in order to buy the agents of production.

Negative Slope of the Demand Curve. The demand curve for long-term loans represents the quantities of funds that business men or firms would, at a given time, borrow on long term. This demand curve, like

other demand curves, has a negative slope; a larger amount of long-term funds, at any given time, would be borrowed at a low rate of interest than at a higher rate of interest. This is true because the demand for loans is related to the demand of producers for facilities and agents of production.

If the producer must pay a high price for a durable agent and borrows the necessary funds, he will require a larger long-term loan in order to purchase it than if the price of the agent were lower. The fact that he will pay a high price for the agent of production signifies either that the prospective rents are large, or that he has a low time-discount rate. If, in order to obtain the durable agent, he has to pay a high price, it indicates that competing buyers also have low time-discount rates or that they, too, anticipate that the ownership of such agents will afford them high rents.

What is true of the particular durable agent is likewise true of all durable agents and other sources of long-term incomes in general. Their current capitalization is dependent on the expectations of rents from them and on the prevailing rate of time discount. If the latter is low, the price that will have to be paid for agents affording given annual rents will be higher, and the quantity of borrowing required to finance their purchase will be greater, and vice versa.

In the preceding chapter it was shown that the demand curve for the purchase of durable agents is a negatively sloped curve; and the demand for loans with which to purchase durable agents likewise is negatively sloped.

DEMAND FOR LONG-TERM LOANS UNDER
CHANGING CONDITIONS

Shifts in the Demand Curve. Shifts in the demand curve for loans occur when the prospects of the future are changing drastically; as, for example, during the business cycle. When business is on the upswing, enterprisers expect a further and further increase in the quantity of goods and services that can be sold at a given price. Such glowing expectations, even though discounted for the necessary period of production, give seeming warrant for enlarging present business undertakings in order to meet future consumer demands. Thus, the prospects of future expanded sales quickly become converted into increased demands for the present control and use of productive agents. In order to obtain the more highly valued present productive goods, increased investment is necessary. The increased demand for investment funds is reflected in a positive shifting in the demand curve for loans. This simply means that more funds will be borrowed, at a given rate of interest, than would be borrowed at that rate of interest in a period of less business optimism.

During a period of business recession the opposite situation prevails. Then there is no longer any certainty that the products of any one industry, or even of all industry, will continue to be salable in the current volume at the current price. So far as the individual business man can see, the probability is that for some time to come existing durable goods will yield smaller annual rents than he had formerly expected.

Instead of seeking actively for additional loans to invest in his undertakings, he would vastly prefer not to have as large an amount of indebtedness as he already has. He will probably endeavor to pay off some of his indebtedness, if he is in a position to do so, in order to reduce the fixed charges of his firm. Thus, in times of business recession the demand curve for loans shifts negatively.

SUPPLY OF LONG-TERM LOANS

Positive Slope of the Supply Curve. The aggregate volume of funds available for long-term loans at any given time would tend to be greater at a high rate than at a low rate of interest. If the rate were somewhat higher under a given set of general conditions, some additional present funds would be made available for lending on a long-term basis. If the rate were somewhat lower, there would be some tendency for smaller quantities of funds to be offered by lenders. The positive slope of the short-period supply curve reflects the fact that, in general, present consumable goods are preferable to promises of goods or income in the future. On this basis, more persons could be found who would forego the present use of goods or services at their disposal (thus lending instead of spending some of their present purchasing power) if the rate of interest were higher than if it were lower.

The general character of the short-period supply of funds for long-term loans is suggested graphically by the market supply curve *S* in Figure 29 on page 332. This indicates the varying amounts of investment funds

that would be devoted to the holding of long-term bonds and similar obligations at varying rates of interest. The supply curve S' indicates the varying quantities of funds that would be devoted to the ownership of

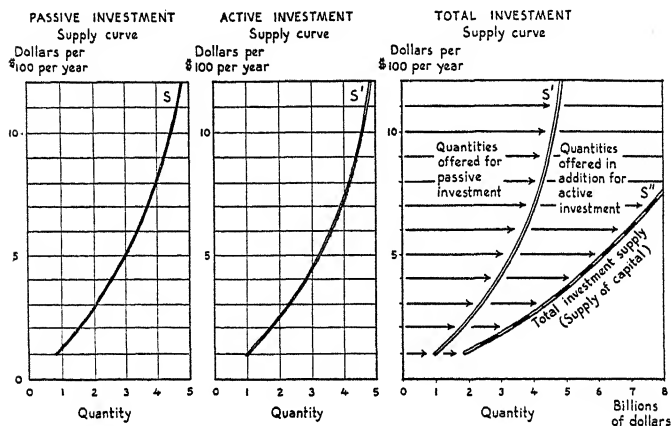


FIGURE 29. THE SUPPLY OF FUNDS FOR INVESTMENT
(Supply of Capital)

stocks and similar proprietary shares at corresponding rates of return, making due allowance for differences in risk and uncertainty of future income. The curve S'' represents these two supply curves as being merged in the total supply of investment funds or, in other words, in the supply of capital.

SUPPLY OF LONG-TERM LOANS UNDER CHANGING CONDITIONS

Shifts in the Supply Curve. A change in business prospects (such as occurs during the course of business

fluctuations) will tend to produce a shift in the position of the supply curve of loans, and thus to alter somewhat the quantity of loans available at any given rate of interest. In a period of declining business activity the supply curve will shift negatively, and less funds will be available for loans than formerly at specified rates of interest. Conversely, the supply curve will shift positively in periods of optimism and business activity, reflecting the availability of larger sums for long-term loans at specified interest rates than under less favorable conditions.

These net shifts in the supply of long-term loans reflect a variety of influences that tend, to some extent, to offset each other. Of these influences the most important are (1) shifts in investment, (2) changes in the willingness of investors to lend rather than spend for consumers' goods, and (3) changes in the amount of bank credit used to finance long-term business undertakings.

Shifts in Investments. The supply of funds for investment in long-term loans is affected, in periods of recovery or recession, by changes in preference, among many people, for investment of an "active" as compared with a "passive" type. Such changes react upon the supply of funds of each type.

During a business recession, for example, there is a severe contraction in the number of comparatively safe opportunities for investment at high rates of yield. The prospective incomes obtainable from the ownership of corporate securities decline, and there is greatly increased doubt as to the capacity of some business

firms to maintain the payment of interest on their bonds or other types of indebtedness. Under such circumstances, those in control of investment funds face two alternatives: (1) to maintain their investment in forms offering possibly large, but nevertheless uncertain, future incomes, at security prices reflecting a fairly high rate of discount (presumably by buying stocks), or (2) to invest in relatively small, but more certain, future incomes at prices that represent a low rate of time discount (presumably by buying bonds).

The efforts of people already owning securities to shift from stocks to bonds will result in the positive shifting of the supply curve of funds for investment in the latter type of security, so that at a given rate of interest more current investment funds would be available than before. This shifting will lead to changes in the present prices of bonds and of stocks that will ultimately offset the advantage of shifting. This is reflected in the sharp decline in the prices of stocks that occurs as a consequence of the efforts of stockholders to "liquidate" their investments.⁶ At such a time, bonds of a conservative character, affording small but certain future incomes, remain comparatively stable, or even rise in price.

Changes in Willingness to Hold Long-Term Investments. This tendency toward a positive shift in the supply of funds for long-term loans resulting from the

⁶ By "liquidate" is meant essentially to shift funds into types of investment, or to exchange them for other present goods and services, that are more likely to appeal to a large number of buyers. Presumably the most "liquid" fund is money.

substitution in investments will be offset in some measure by the effort of many people to withdraw altogether from the investment market as the business recession continues. The supply curve of loans at such a time will be affected also by the temporary cessation of new investment and by the diminished reinvestment of interest or maturing principal sums. Sums received by individuals as dividends or interest that ordinarily would be reinvested, and thus would serve to maintain the current supply of durable agents of production, will in somewhat larger measure be expended for consumers' goods, or merely held in some liquid form.

This negative influence, taken in conjunction with the positive influences resulting from substitution of investment, might result in a net negative shift of the supply curve of capital as a whole. Such a net negative shift in the supply curve would be reflected in lower bond prices as well as lower stock prices. Thus, the aggregate supply curve of capital (including the funds available both for long-term loans and for proprietorship holdings) would tend to shift negatively during a period of protracted business recession and uncertainty.

During an upward swing in business prospects, on the other hand, the movement of supply would tend to be the opposite. Then the prospects of substantial earnings in the more speculative fields would tend to induce shifting to such investments by some investors, at the expense of types of investment yielding a lower rate of return. This tendency to a negative shift

in the supply curve for long-term loans would tend, however, to be offset by net additions to the supply.⁷ This would result in part from the increased willingness of people to use present funds for lending rather than spending for consumption, and partly from expansion of bank credit.

Shifts Resulting from the Expansion and Contraction of Bank Loans. Under changing conditions shifts in the supply curve of loans reflect not only changes in the amounts of funds that individual investors devote to investment, as compared with expenditure for consumption, but also the expansion or contraction of credit by financial institutions. In the final analysis, of course, investment funds are made available to business enterprises because individual investors are willing to use funds at their disposal for investment instead of spending them. However, at any one time it is possible for business firms, both individually and in the aggregate, to obtain some additional funds as a consequence of credit extended by commercial banks. For the most part, such credit is employed to finance the purchase of materials and supplies on a short-term basis, and so falls outside the limits of the present discussion. A certain amount of bank credit, nevertheless, is employed at all times in financing the purchase of durable plant and equipment, or securities repre-

⁷ Further positive shifting of the supply of long-term loans would tend to result from the transfer of funds from the short-term market to the long-term loan market. Part, and perhaps a very substantial part, of this positive shift might result from decisions in which the individual played a small or negligible part, as where the division of corporate earnings between dividends and reinvestment rests in the hands of corporate directors or the directors of large investment institutions.

senting such facilities, and so falls actually within the field of long-term loans.

The granting of loans by banks to business firms (or to people engaged in distributing new securities that have not yet been fully paid for by the ultimate investors) is based on the belief that the additional production made possible by the loans will prove to be justified by the demand for the additional products when completed. In periods of business expansion, bright prospects of future sales encourage firms to borrow, and banks to lend. Conversely, during a period of business contraction, financial institutions in their lending activities reflect in an exaggerated degree the decreasing willingness of people to devote funds to lending. The supply of loans, therefore, dwindles rapidly as the expected future earning power of agents of production declines. Thus as business conditions change, there are likely to be sharp changes in the volume of bank loans extended to business firms.

Graphic Illustration. Figure 30 on page 338 illustrates the shifting that tends to take place in the total investment or capital supply and in the relative portions of it that will consist of active and passive investment, during periods of advancing business activity as contrasted with periods of business recession. The left-hand side of the figure indicates the portion of the total supply of capital that would consist of active investment during periods of advancing business activity. This contrasts with the right-hand side of the figure, which shows the shrinkage in active investment in a period of business recession. This shrinkage would be due

to the marked negative shift in the supply curve of funds for the holding of stocks during such periods. The supply curve of funds for long-term loans shifts negatively to a comparatively less degree, as a con-

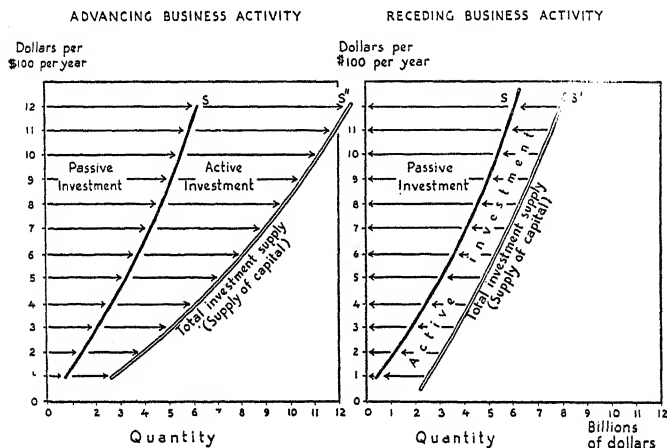


FIGURE 30. EFFECT OF CHANGING BUSINESS CONDITIONS ON THE INVESTMENT SUPPLY (SUPPLY OF CAPITAL) CURVES

sequence of substitution of investment by many holders of stocks. This latter movement, arising as investors become more timid during periods of failing optimism, tends to offset the reduction otherwise occurring in the supply of passive investment funds.

LONG-PERIOD RELATION OF INTEREST TO TECHNIQUE AND COST OF PRODUCTION

Effect of Changes in Interest Rates upon Investment in Durable Agents. With a given rate of interest, it

will be advantageous for business enterprises to seek additional funds for the purchase of durable agents as long as the rents of these agents are sufficient to provide for the ultimate repayment of their purchase price, plus the going rate of interest on the investment.⁸

Suppose, for example, that a machine costing \$10,000 would last twenty years, and would yield an annual rent of \$850. If the prevailing interest rate were five per cent, a firm would find it advantageous to borrow the purchase price of the machine. A sum of \$303 per year, if set aside and accumulated at compound interest, would suffice in twenty years to cover the replacement of the machine or the repayment of the loan. The remaining \$547 would exceed, by \$47, the annual interest that would have to be paid on the \$10,000. If, however, the interest rate were six per cent, it would not be advantageous to purchase the machine. Although a smaller annual sum, \$272, would be required for amortization of the purchase price, the remainder of the rent, \$578, would fall short of the \$600 necessary to pay the annual interest.

Thus, a rise in the interest rate would lead to the gradual disappearance from productive use of all agents whose own costs of production exceeded the present worth of their prospective rents, capitalized at the new rate of interest. As existing agents wore out, they would

⁸ If an agent were perfectly durable, no provision would have to be made for "wear and tear" and, as a consequence, the entire annual rent would be available for the payment of interest. If the life of the agent is short, a large part of the annual rent must be applied to the repayment or amortization of the purchase price, and a smaller part will represent the sum available for interest payment.

not be replaced, because the cost of doing so would exceed the capitalized future incomes obtainable from them.

A comparatively slight lowering of the interest rate, on the other hand, would greatly enlarge the number of agents whose rents would be sufficient (if capitalized at the lower rate) to yield the prevailing rate of interest on the investment necessary to produce them. A fall in the interest rate would result in the further substitution of mechanical devices for labor, up to the point at which the aggregate savings in labor costs would be just equaled by the additional rents of the durable agents substituted. It would, as a consequence, increase the number of people seeking loans to finance additional production.

The Interest Rate and Overhead Cost. Interest on the investment in necessary productive facilities constitutes a part of the overhead cost of business enterprise. A change in the rate of interest would, as just indicated, alter the most advantageous combination of durable agents and variable factors of production, and so would affect the proportion of overhead to total cost. A lower rate of interest would lead to the substitution of more machinery for labor, and vice versa.

A change in the interest rate would at the same time affect the capitalized value of all differential advantages in production that might be possessed by individual firms. With a lowering of the interest rate, for example, a rent of \$1,000 per year would represent a return at the going rate on a larger capital sum than before. There would therefore be intensified competi-

tion for those agents that were capable of yielding higher annual rents, or differentials, over and above the rents obtainable from less effective agents. This competition for the present ownership of superior agents would result in bidding up their prices to new levels, at which the rate of return on capital invested in them would be no greater than the rate of interest prevailing generally in the market.

Thus, a fall in the interest rate would raise the value of all durable agents that could not be duplicated, and correspondingly enhance the value of the investment in them. At the same time the utilization of physical equipment would be extended to include agents whose capitalized expected rents had previously been insufficient to justify investment. Furthermore, all existing claims against future incomes, represented by existing corporate stocks and bonds, and other sources of future income, would be increased in price.⁹

Relation between the Rate of Interest and Economic Development. A fairly definite relation may be noted historically between the interest rate and economic development: high interest rates prevail in new countries or in areas in which economic expansion is oc-

⁹ In discussing interest the significant thing is the actual rate of yield on the investment; that is, the money income taken as a percentage of of the current market price paid for the securities, regardless of the nominal interest, face value, or the price at which the security was originally issued. For example, a \$1000 bond may nominally bear interest at the rate of five per cent, or \$50 per year. But if the prevailing rate of interest is four per cent, competition among investors for control of this relatively high yield would bid up the market price of the bond toward \$1250, at which point \$50 per year would constitute only four per cent on the investment necessary to obtain present ownership of it. Anyone paying the current price of the bond would obtain from it a yield of only four per cent.

curring at a very rapid rate, and lower interest rates obtain in older or economically more mature areas. For the most part the rate of interest on long-term investments in the United States has been higher than in England and France, and much of the development of this country during the nineteenth century was financed by long-term investments from abroad. Even within the United States there were similar differences in interest rates between new and old sections of the country, between the more thoroughly developed areas and the newer, more rapidly expanding frontier sections.

Several factors help to account for the high interest rates that prevail in new or dynamically changing economic areas. The most obvious is, of course, the risk element. Where the course of future developments is uncertain, it is impossible to do more than guess at the size and duration of the future incomes. The newness of the developments gives a speculative character to investments in such regions. In order to attract investment funds, therefore, lenders must be offered some differential over the return they could obtain by investing in more stable enterprises (or at least ones thought to be more stable) in well-developed areas. Thus, to secure a given quantity of investment funds, the rate offered must be higher.

On the other hand, the demand for credit, even at the higher rates of interest that must be paid, will remain large in such areas. Great possibilities of expansion are afforded by the existence of large undeveloped resources in comparison with the number of people and the

quantity of material equipment with which to exploit them. These possibilities lead business men in the developing area to place a very high premium on the present possession of the necessary facilities. Prospective rents are large, even though uncertain.

In more mature countries or areas, investment in durable plant and equipment could be continued indefinitely, but it could be done only on the basis of expectations of smaller and smaller, or more and more remote, future incomes; that is, on the basis of a lower and lower rate of interest. Under such circumstances a larger percentage of current income would tend to be directed to present consumption. The exploitation of new economic areas, or the beginning of a new period of dynamic expansion at home, would once more provide opportunities for investment at higher rates of yield, and would tend to increase the proportions of current funds that would be loaned rather than spent for consumption.

C H A P T E R X I V

Enterprise and Profit

At many points in the preceding chapters it has been convenient to speak of the business firm as a business enterprise, and to apply the term "enterprise" to the activities of initiating and conducting business undertakings. The present chapter will be devoted to a more detailed examination of the personal activities that are included under the general heading of "enterprise", and to a discussion of the incentives that exist for the undertaking of these activities.

NATURE OF ENTERPRISE

Enterprise may be defined as the undertaking of economic activity. It consists essentially of the effort on the part of individuals or groups to direct the use of economic agents in such a way as to gain an income by taking advantage of "profit opportunities" evident in the structure of current and prospective prices.

The distinguishing feature of enterprise is control of economic activity. From a legal standpoint (as noted in

the preceding chapter), the control of business activity is vested in ownership. But the development of the corporate form of business organization has led, in fact, to a marked concentration of the control of economic resources and, therefore, of the larger part of active business enterprise. The influence of the small corporate stockholder is very small; the active direction of industry is exercised by a comparatively small number of people who occupy dominant positions by virtue of large individual stockholdings or as a consequence of corporate devices designed to "pyramid" the control. In some instances the control of large investments, amounting to hundreds of millions of dollars, has been thus delegated to individuals or groups whose own investment in the corporation is negligible.¹

As a consequence of such developments in business organization, the actual division of the gains or profits of the business enterprise among the various groups (management, dominant stockholders, and small stockholders) interested in the enterprise will vary from one concern to another, depending upon the varying circumstances of each case. So far as the small investor is concerned, his share in control is virtually limited to the selection of the particular corporation to which he shall intrust his investment funds. Having purchased the shares of a particular corporation, he must trust that the dominant stockholders, in their endeavors to promote their own interests, will direct the affairs of the corporation in such a way that he also will

¹ For a more detailed discussion of these developments in corporate organization, see Modlin and McIsaac, *Social Control of Industry*.

benefit. If he loses faith in the intentions or ability of those dominating the corporation, virtually the only course open to him is to sell his shares for what they will bring in the market, and invest the proceeds in some other way. In this act of sale, the small shareholder also is actively exercising control over his own investment funds for the time being; but aside from such decisions as to investment and reinvestment, he has little share in the active direction of industry.

Opportunities of Enterprise. Opportunities for business activity arise in many different ways. Of these, the most common are those that are involved in the provision of desirable goods and services to meet the demands of consumers, or in the production of indirect agents that will contribute in a roundabout way to the satisfaction of people's desires. These opportunities exist because of the differentials that prevail between the prices of indirect agents and the prices of the goods and services that can be produced with their aid. Such enterprise usually involves the investment of present funds in land, durable plant facilities, materials, labor, and other services required for the production of finished goods for subsequent sale. It may, however, simply involve the investment of resources in the means for storing, transporting, and resale of goods at the desired time and place.

The more spectacular opportunities for enterprise are those that are connected with the adaptation of industry to changing conditions. Wherever disequilibrium exists in current undertakings as compared with the prospective demands of the future, there is an

opportunity for competent business men to make additional gains by undertaking activities that will tend to correct the disequilibrium. Those enterprisers who are keenest in detecting the potential demands of consumers for new products, or are promptest in initiating changes in the scale of their undertakings, in the face of changing conditions, may make greater gains, or avoid greater losses, than accrue to their less alert rivals. Indeed, it is chiefly by virtue of such adaptive activities in meeting dynamically changing conditions that the largest gains are to be made. Similar gains, of course, may be obtained by those whose genius makes possible new combinations in the use of agents, so as to produce a finished product at a lower price than has hitherto prevailed. In embarking on all such ventures the enterpriser must judge the changes that will be most profitable in the light of his appraisal of consumer demands and his estimate of costs, bearing in mind the alternative opportunities open to him.

Enterprise and the "Factors of Production." Enterprise is viewed as the act of directing the use of economic agents because, in choosing types of productive activity, enterprisers determine the purpose to which will be devoted the available resources, labor, and capital funds for investment. According to this viewpoint, natural resources, labor, and capital are termed the "factors of production."²

² Such a classification of factors of production (natural resources, labor, and capital) is especially useful in connection with the study of international trade. Cf. Dell, B. N., and Luthringer, G. F., *Population, Resources, and Trade* (1938).

By investing in the construction of plant and equipment and by purchasing raw materials and labor for productive purposes, enterprisers mobilize these essential factors of production. Seeking profits through trade, enterprisers will, as the result of selling the products of one geographical area to distant buyers, cause a movement of resources from areas where they are plentiful to regions where they are in demand for utilization in industrial production. The extent of capital investment by enterprisers in one place, as compared to other places, will affect the demand for labor services in the respective areas.

The activities of enterprisers, therefore, determine the manner in which these factors of production are utilized, where they are utilized, and the extent to which each is used in proportion to the others. The anticipated demands of consumers will, of course, affect the choices of enterprisers.

Private versus Social Productivity. Business activities stimulated by opportunities for obtaining profits are not altogether confined to the making of "productive" adaptations in the economic structure. This follows because, as indicated in the chapters on supply, maximized net receipts for the individual concern, particularly under conditions of monopoly or monopolistic competition, may be attained by restricting output as compared with the volume of production that would be undertaken if conditions of pure competition prevailed. Thus, the prospect of profits may be enhanced by activities that reduce the sum total of goods and services available to the community. Still other op-

portunities for profit exist for those who are willing to take advantage of the ignorance, credulity, or misjudgments of other people. Thus, it cannot be taken for granted that enterprise conducted for private profit is necessarily "productive" in terms of real income to society. However, organized society could scarcely exist under a system of profit incentives if there were not a substantial degree of correspondence between private and general interest.

PROFIT

The Concept of Profit. The term "profit" is frequently applied loosely to the return received by the owners of a business; as, for example, the dividends of the owners of corporate stocks. In this sense, profit represents the difference between the aggregate receipts from business activities during a given period and the total outlays for production during the period.³ Such a conception of profit is too broad, however, to have much significance in economic analysis.

The net earnings of business enterprise remaining for distribution as *dividends* to the owners after all outlays, including interest on borrowed funds, have been met, depend upon the success of the particular

³ Total costs of production include implicit or alternative cost; that is, the allowance of their current market value for services rendered by the owner or for the use of his property in connection with the business. The proprietor of a business would allow to himself, as manager, a wage representing the amount he could get for equivalent services by hiring himself out to others (implicit wages) instead of working for his own firm. If his capital is invested in land and buildings used in his business, he might allow as a cost the interest he could obtain by investing that capital in other ways (implicit interest). Or, alternatively, he might allow as a cost the rent he could obtain by leasing this land and equipment to others instead of using it himself (implicit rent).

business undertaking. They may vary from large sums to negative values, or losses. Thus, the dividends of the owners of a business are contingent or residual incomes; whereas passive capitalists, as already explained, lend their funds to others for a stipulated, regular interest payment, which is frequently guaranteed by the borrower by pledging as security some part or all of the assets of the business. Included in dividends (or in earnings available for distribution as dividends) would be an income attributable to purely passive investment; namely, that amount of income that the investor could obtain if he invested in a loan without risk.

The first step in the further analysis of profit, therefore, is to compare the dividends received by business owners with the incomes received by passive investors. Investments in the bonds of high-grade business corporations or established government units involve the smallest possible degree of risk, and the income obtainable from such investments affords the closest possible approximation to the current rate of interest in the long-term loan market. Any excess in the dividends received by the active investor or business owner, over and above the interest return that could be obtained by merely passive investment, will constitute profit in the strict sense of the term. The income received by the active investor, therefore, must exceed implicit interest if any profit is to be obtained. His dividends include an implicit interest payment, representing the amount he could obtain by mere passive investment, plus an amount that constitutes profit (or minus an amount representing loss).

The Rate of Profit. Inasmuch as dividends are ordinarily stated in terms of money, and the amount of the investment is also usually stated in terms of money, it is customary to express the dividends as a percentage of the investment and to speak of the rate of return. Thus, the rate of return on active investment may be compared with the rate of interest on investments in the form of loans. As indicated above, the rate of profit is equal to the rate of return from active investment minus the prevailing rate of interest on risk-free loans.

Why should a differential in net revenue above the prevailing rate of interest accrue to the enterpriser? The theory of profit is concerned with the explanation of the existence of this differential and with the circumstances that may produce variations in the differential from one firm or industry to another, and from one period of time to another. The fundamental fact in the explanation of profit is the existence of uncertainty and risk, attaching unavoidably to business enterprise.

Relationship of Profit to Uncertainty and Risk. Some of the risks of enterprise are attributable to dynamic changes. Yet even if there were no changes in population, technology, resources, tastes, or distribution of personal abilities, there might still be variations in fortune resulting in uncertainty regarding the prospects of individual concerns. This would require the exercise of business judgment, and the assumption of some risks with respect to the outcome of particular ventures.

Thus under stable conditions there may be no risk in the total production of food, but still there would be risk for the particular individual or firm engaging in such production. Opportunities for extra gains would exist, accompanied, of course, by the risk of loss in the event of failure or mistaken judgment. This risk would deter the less enterprising investors from venturing their funds in the more hazardous undertakings. It would tend, therefore, to permit an adjustment of prices and costs such as to afford net receipts or profit to the enterpriser over and above the prevailing rate of interest. This latter return is sufficient to satisfy the passive investors, who will accept a lower average return, in preference to the potentially higher, but correspondingly uncertain, income that the enterpriser may obtain.

The essentials for the emergence of profits under any conditions are (1) the existence of uncertainty and risk, and (2) the uninsurability of such risks as are apparent. If there were no uncertainty surrounding the outcome of business ventures, no risks would attach. Production under conditions of pure competition would, in the absence of risk, be adapted to a scale that would equate prices and costs (including interest at the prevailing rate on passive investment as a cost). The significance of the elements of risk and uncertainty is multiplied many times under dynamic conditions prevailing in modern economic society.

Risks must be uninsurable if profit opportunities are to emerge, because if they were insurable, the enterpriser could reduce the risks to a specified cost paid

currently to some type of insurance company. In the play of economic forces, such forms of risk come to be included in the costs to which prices are brought into equilibrium. The risks and uncertainties that enter into the explanation of profits are of such a character that they cannot be insured against, and thus cannot be included in the costs of production of the business.

Profit and Risk Avoidance. Because of the close connection between risk and profit, it is often said that profit is the reward of risk taking. This does not mean, however, that the way to make large profits is to assume large risks, because the person taking large risks is taking a proportionate chance of incurring large losses. The really significant point is that when the prospective risks attaching to a particular venture are large, there will be few who will care to take the risks involved, unless the chance of a large gain is sufficient to balance the possibility of a loss. There must thus be a prospect of large profits, if active investors are to be induced to invest their resources in the face of the apparent risks attending a particular venture. They will actually obtain the prospective profit if, in the course of events, the anticipated hazards do not prove to be actualities.

Risks are assumed by the enterpriser because in no other way can he put himself in position to realize a hoped-for profit. The enterpriser who sees the prospect of making a profit by engaging in a particular business activity can actually obtain the prospective return only if he commits the resources at his disposal to that activity, and if the outcome of events agrees

with his expectations; that is, if the risks and uncertainties do not eventuate.

The greater the risks that must be assumed, the greater must be the prospect of profit if enterprisers are to enter the industry in question. This suggests, then, that the enterpriser is an individual who is, or thinks he is, especially adept at avoiding the risks that no one else is capable of correctly appraising. To the extent that this estimate of his own ability is correct, he is likely to be successful in his venture.

In summary, the existence of risks and uncertainty does not account for the magnitude of the profits realized at any time. It simply determines the magnitude of the profit *expectations* that must exist if new enterprise is to be undertaken, or if existing undertakings, which require new purchases of agents for continued production, are to be carried on.

MONOPOLY PROFIT

A final point requiring examination is the connection that exists between monopoly gains or profits and the circumstances of risk and uncertainty that have been indicated as the fundamental source of profits in general. Where a commodity is produced by a few firms, under conditions of oligopoly or monopoly, these firms might for long periods obtain total revenues considerably in excess of total costs of production, including as an element in cost the interest on the investment in plant and equipment necessary for production. Such excessive returns might continue to be received by the oligopolistic or monopolistic enterprises, even

though very slight uncertainties or risks attended their own operations.

These circumstances do not, however, contradict the explanation of profits outlined above. For it must be remembered that the effect of risk and uncertainty is to deter the entrance of rival producers into a particular industry or occupation, which would alter the supply conditions in that industry relative to the demand for the product. Entry may be deterred by risk and uncertainty with respect to either the ultimate demand for the product or the cost conditions that would be encountered in production. The entry of rivals into a given industry may also be deterred by the risks that would attend the effort to enter the industry. If large investments are necessary before production can be undertaken and the goodwill of the ultimate consumers gained, potential rivals may refrain from entering an industry in which large gains might be made because they fear retaliatory tactics would be employed against them by the firm or firms already in the industry. This hazard confronting potential rivals may operate to preserve the position of the concerns already in the market, and enable them to obtain excess returns for long periods, if not permanently. Large risks and uncertainty account for monopoly profits, therefore, in the same sense that they account for profits in general.

The receipt of monopolistic gains by firms does not mean, however, that the stockholders in monopolistic enterprises will, as individuals, receive a higher rate of return on their investments than is received by the

owners of stocks in non-monopolistic enterprises that afford a prospect of equally certain incomes to their owners. If the stocks of monopolistic enterprises are being bought and sold on the securities exchanges, people with funds to invest will naturally prefer to buy shares yielding larger annual incomes than those yielding smaller annual incomes, attended by the same degree of risk. As a consequence, the prices of stocks having high annual earnings will tend to be bid up by competition among investors. The actual rate of yield on the current investment in those stocks will be approximately the same as the rate of yield on the current investment in other stocks affording smaller dividends, but involving about the same degree of risk.

In other words, the existence of conditions approaching those of pure competition among investors results in the capitalization of additional monopoly profits. To the person buying securities it makes comparatively little difference, so far as his income is concerned, whether the enterprise is a monopoly or not. If after he buys the monopoly profits increase, he will of course receive larger dollar dividends per year. Nevertheless, his share in the monopoly gains will be reflected chiefly in a further rise in the capital value of his shares as they are bid up in the market by the competition of investors.

In some instances, however, monopoly profits are paid out, not as dividends to all the stockholders generally, but shared in other ways among the larger shareholders and the active management. Large bonuses or commissions may be voted to managing officials

where the management group is sufficiently powerful to control the voting of dividends by the board of directors. In other instances, additional corporations are created by large stockholders and managers to supply goods or services to the main corporation. Through excessive payments for such services, large parts of the monopoly profits of the principal corporation may be distributed in the dividends of the ancillary corporation. When it is within the power of the dominant group in a monopolistic corporation, by one device or another, to appropriate part or all of the monopoly profits, the general stockholders will receive merely "normal" profits on their investments.⁴ No part, or only a small part, of the monopoly profits would then be capitalized in the current market value of the corporation's securities. As long as the dividends paid to stockholders were as large as those received by stockholders in other enterprises involving an equal degree of uncertainty and risk, the investors would continue to supply the necessary investment funds to the monopolistic corporation.

⁴ Such a strategic position could be obtained in a corporation producing under purely competitive conditions. As pointed out in the earlier chapters, however, excessive returns to competitive industry result in the entry of new firms, or the expansion of the old, until the adjustment of demand, supply, and price yields a return just sufficient to maintain investment. Therefore, if the management of a competitive firm appropriated any more than the excess returns arising temporarily from changing conditions in the industry, it would shortly "milk" the corporation into bankruptcy or place it in an unfavorable position in competition with rival firms.

Although it is questionable whether one can visualize a "market" for the services of the management of large corporations, nevertheless those seeking opportunities for large gains are less likely to choose competitive enterprise. They are more likely to work themselves into a position of control in a monopolistic firm, where their chances of receiving self-paid bonuses and commissions are likely to be greater.

C H A P T E R X V

Economic Equilibrium

MEANING OF ECONOMIC EQUILIBRIUM

INTEGRATION OF ECONOMIC ANALYSIS

UP to this point the analysis of the factors affecting demand, supply, and price has been restricted, for the sake of simplicity, to particular commodities and services under certain specified assumptions as to the nature of general economic conditions. In the earlier chapters the demand, supply, and price of consumers' goods were discussed on the assumption that the prices of the agents of production were given and would not be affected substantially by changes in the production of a particular commodity. Thereafter, the conditions affecting the demand, supply, and prices of different agents of production were considered, the conditions of demand for the final products being taken as fixed. Thus, the general connection existing between the de-

mand for specific consumers' goods, on the one hand, and the prices (wages or rents) paid for the productive services of people and the uses of material agents, on the other hand, was traced. The discussion of investment, interest, and profits completed this part-by-part analysis of the operation of the economic system.

The two remaining chapters will be devoted to the description and illustration of the more general interrelationships that, in the last analysis, connect the price of every commodity or service with the price of every other commodity. Changes in the demands of consumers for one good, as compared with another, will not only affect the price and production of that good, but will also react indirectly upon the prices and production of other goods as well. Likewise, the conditions of supply of any human service, or any use of material agents, will react upon the supplies and prices of other goods of many kinds. Thus, a change anywhere in the entire price system will tend to produce compensatory changes at many other points.

TYPES OF ECONOMIC EQUILIBRIUM

The analysis of the general interrelationships throughout the economic system comprises the theory of economic equilibrium. The general meaning of the term "equilibrium" should be clear from the analysis of the preceding chapters; it describes a situation in which no individual or business organization could make any change, either in employment, investment, volume of production, price, or purchase of goods, that would improve his own position. Economists are ac-

customed, however, to speak not only of "general equilibrium" throughout the economic system as a whole, but also of "partial equilibrium", signifying by this term a condition of equilibrium within an industry, considered by itself. Students are also accustomed to distinguish between "static equilibrium" and "dynamic equilibrium." "Disequilibrium", either partial or general, static or dynamic, is the counterpart of equilibrium. These various terms will be defined and illustrated in greater detail in the following sections.

Partial Equilibrium. When there is no incentive for the firms engaged in a given industry to make changes in output or prices, partial equilibrium exists. The equilibrium is "complete" for the industry, but the term "partial" is applied in order to distinguish this type of equilibrium from equilibrium throughout the entire economic system. The latter is called "general" equilibrium. Equilibrium may exist in a particular industry or a group of closely related industries and yet, in other more remotely related industries, changes may be taking place.

General Static Equilibrium. In general static equilibrium the entire system of prices and the adjustment of output by firms in all industries would be in balance. Under general static equilibrium no firm in any industry would have an incentive to change output or price quoted.

General Dynamic Equilibrium. It is possible, also, to think of the economic system as in a state of continuing dynamic equilibrium. The concept of dynamic

equilibrium implies the possibility of the adaptation or adjustment of prices and production throughout industry, in close step with those dynamic changes that are constantly in progress, such as changes in population, in personal tastes, in technique, and in knowledge of the location and utilization of raw materials.

It is scarcely necessary to point out that neither general static equilibrium nor general dynamic equilibrium is ever actually achieved. The conceptions are useful, nevertheless, because they help in the appraisal of the force and direction of economic adjustments in the integrated economic system.

Partial and General Disequilibria. Disequilibrium appears wherever production is either too large or too small to meet the demands of the market at the time the finished goods and services are offered for sale. If such disequilibrium appears in one industry or in a few related industries, the disequilibrium is partial. If it is generalized so widely as to affect the entire economic system, it constitutes a case of general disequilibrium. General disequilibrium manifests itself in varying degrees of severity. In modern times economic activity has tended to fall into a fairly pronounced pattern of periodic fluctuations, in which sharp disparities between production and the requirements of the market emerge at more or less regular intervals.

The discussion in the previous chapters of this book has been concerned at many points with the adjustment of individuals, firms, and industries to changing conditions. Thus, while the terms "partial equilib-

rium" and "partial disequilibrium" may be new, the situations described by those terms have already been discussed. The following section of this chapter will constitute a brief review of the relationships that would exist within the economic system as a whole under conditions of general equilibrium. The final section will be devoted to the discussion of various phases of partial disequilibrium. The forces that result in the periodic recurrence of general disequilibrium, ordinarily referred to as the "business cycle", will be analyzed in the concluding chapter.

GENERAL EQUILIBRIUM

THE PRICE SYSTEM UNDER STATIC CONDITIONS

Relationships between Prices and Costs. If equilibrium prevailed throughout the economic system, no motive for change would exist; that is, no advantage could be gained either by the expansion of old enterprise or by the initiation of new ventures. Costs of production would be in equilibrium with prices. The term "motive for change" in this connection, however, refers to permanent or cumulative change. In a static economic system, short-period changes in the form of limited and temporary deviations from the "normal" pattern of demand, supply, and price might occur. Purely as a result of the variability of people's desires, or because of natural phenomena such as the weather, fluctuations above and below average prices

and fluctuations above and below average demands for particular goods and services would occur.

In such a situation, the adjustment of prices and the output of individual firms, whether under conditions of competition or monopoly, would tend towards a balance, or equilibrium position. Variations in the demand, supply, and price of particular commodities might occur, because of conventional seasonal shifts in consumption, or because of the effects of the weather and the seasons upon agricultural production, transportation, and other industries. If, however, no frictions were involved in economic adjustments, the variations in prices that would accompany such variations in relative demand and supply would at once initiate compensatory shifts in economic activity.¹

The consumption of an article which was relatively short in supply would tend to be restricted by a higher price. This would lead to a resort to substitutes, checking the rise in price and tending to bring the prices of the substitutes and of all related indirect agents into equilibrium. At the same time, more economic effort would be attracted to the production of the relatively scarce, high-priced good by the prospect of greater profits to be obtained by so doing. So long as any price advantage to consumers or profit advantage to producers could be gained by shifting, the process of adjustment would continue. Eventually every buyer and

¹ Static balance, even in the presence of friction, and without pure competition throughout the system, is conceivable. It involves simply the assumptions that, under the given conditions, cumulative changes do not occur and that every individual has sufficient time at his command to make those adjustments that will maximize his returns.

seller would have reached the point of maximized advantage, and a new balance would be established.

Equilibrium of the price system, even in a static economy, would not necessarily mean that every person would be fully employed. Unemployment would tend to be limited, however, chiefly to those out of work because of seasonal variations in certain industries, and to the economically inefficient, or "unemployable."²

THE PRICE SYSTEM

Price-Cost Relationships within a Given Industry. The price-cost relationships within a given industry (constituting a part of the whole price system) are illustrated in Figure 31, a simplified diagram, in which the steel industry with its products is taken as an example. Here, as indicated in the diagram, a few materials, including iron ore, flux, fuel, and alloy metals, are converted, by the employment of labor and elaborate facilities, into a wide variety of finished and semi-finished articles ranging from heavy machine castings to nails.

The price of any one of the basic materials, such as iron ore, will depend, on the one hand, upon the conditions under which it is supplied and, on the other hand, upon the aggregate demand for products embodying derivatives of iron ore. The aggregate demand for iron ore re-

² The term "unemployable" carries no scientific opprobrium. It means merely that the contributions that these persons can make to the satisfaction of men's desires, reflected as they are in the productive and distributive system, are not valued sufficiently to make it worth an employer's while to hire them.

flects the competing demands for steel and iron for use in producing all of the different finished goods in which they may be utilized, taking into account the possibility of substituting other materials at every stage. Likewise, the prices of machinery and tools, land and buildings, and human services required for the completion of these products will be determined in the same manner.

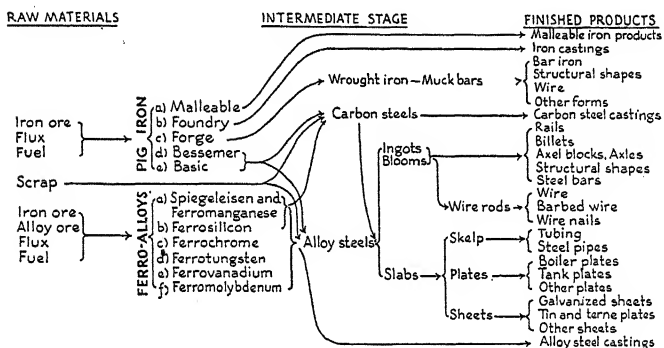


FIGURE 31. STAGES OF PRODUCTION FROM RAW MATERIALS TO FINISHED PRODUCTS, IN THE IRON AND STEEL INDUSTRY

Wrought iron produced by puddling process. While practically all forge iron is made into wrought iron, some wrought iron is made from other kinds of pig.

Carbon steels produced on large scale in Bessemer and open hearth furnaces and on a much smaller scale in the crucible, in electric furnaces, or by the cementation process and often from special pig iron. The former is "tonnage steel"; the latter is "high-grade carbon steel."

Alloy steels produced mainly in open hearth and electric furnaces from the ferro-alloys and scrap and pig iron.

Reproduced from Berglund, A. and Wright, P. G., *The Tariff on Iron and Steel* (The Brookings Institution), 1929, p. 18, by permission.

The price of any raw material, or of any requisite human service, will tend to reflect the aggregate demand for all of the products into which it enters.

At the same time the price so attached to any ultimate resource or service by virtue of the aggregate demand for it will affect the price of any one of the final products, through its effect on the cost of producing the final product. The enterpriser who undertakes the production of any single one of the myriad of steel products, say metal office furniture, is likely to find that his demand for steel is such a small part of the total demand for steel as to have virtually no direct effect upon its price. In other words, he is in the position of a buyer under conditions of pure competition among the buyers. The price of steel sheets, so far as the producer of metal office furniture is concerned, is a given fact about which he can do nothing. Within given technical conditions and possibilities of substitution, the market price of steel determines the cost of materials for him.

Production will be undertaken by this furniture manufacturer only if the prospective price of the product, when finished, is adequate to cover the costs of production. These costs of production consist of the prices that must be paid for the requisite quantities of steel and other necessary materials and labor, together with a return on the necessary investment in plant facilities and equipment. If the prospective price of the product is not sufficient to cover the prevailing prices of the necessary agents, production of metal office furniture cannot be undertaken, or, if already undertaken, can-

not be continued indefinitely. Thus the price that is set for steel determines the proportions in which the output of steel is distributed among the various possible uses. In a similar way the allocation of all resources to their various uses is accomplished by their respective prices, because these prices constitute costs of production to the fabricating industries.

A change in the demand for any single final product (for example, electric refrigerators) will, in some slight degree, affect the costs of production of stoves, office furniture, tools, and the other products employing common raw materials or agents. Or, if more steel is required for automobiles or bridges, this will be reflected in an increased demand for steel, and in some upward tendency in its price. This in turn will appear to the producer of furniture, refrigerators, and automobiles as an increase in costs. The higher price will tend to restrict each manufacturer's purchases of steel and induce him to seek substitutes. On the other hand, a decline in the demand for certain products employing steel will tend to reduce the costs of the producer of metal furniture, refrigerators, and other steel products to the extent that it brings about a lowering of steel prices.

Interdependence of Prices and Costs throughout the Price System. The price and cost relationships of the various steel products are also linked with the prices and costs of goods produced from raw materials other than steel. The use of machinery and tools, land and buildings, and human activities, might be shifted, in some degree at least, from the fabrication of steel

products to the manufacture of other goods, were the prices of the finished products to change relative to each other.

For the sake of simplicity the illustration reproduced above made no attempt to indicate the wide variety of products of the iron and steel industry, such as machines and tools, that are employed as indirect agents in the production of other goods. Neither did it picture the supplementary processes that are involved in the distribution of the finished products of the steel industry, such as the manifold services of warehousing, transportation, banking, insurance, and merchandising. The agents, materials, and services employed in these complex activities likewise must have prices attached to them sufficient to induce the allocation of materials and labor to them. The distributive and financial processes cannot be carried on unless the prices attached to the final products to which they are contributing are adequate, in prospect at least, to attract scarce material and human services to these uses and occupations.

The price system as a whole comprises innumerable parts similar to the one just described. All of them are interrelated, more or less directly, depending upon the possibilities of substitution in the use of final products and in the employment of the agents of production. The tabulation on page 369 may afford a visual impression of the complexity and mutuality of these relationships, in which, literally, the price of everything depends upon the price of everything else. The demand for a particular consumers' good depends upon

CONSUMERS' GOODS	INDIRECT SERVICES	INDIRECT AGENTS	UNFINISHED MATERIALS	ULTIMATE RAW MATERIALS AND SERVICES
Price of a particular good dependent (1) on <i>desire for it</i> , conditioned by its price as compared with prices of other consumers' goods, (2) upon prices of indirect agents used in its production — i.e. upon its <i>costs of production</i> , and (3) upon the extent of control of the market if conditions of oligopoly, monopoly, or monopolistic competition exist.	Price of each of these indirect goods reflects (1) the ultimate demand for respective products, (2) the possibility of substitution of one indirect agent or material for another, (3) the prices of the ultimate materials out of which each one is made — i.e. <i>its cost of production</i> , and (4) the extent of control of the market by buyers or sellers — [where either oligopoly, oligopsony, or monopolistic or monopsonistic competition exists].			Prices of the ultimate raw materials and services reflect (1) the aggregate demand for each of them, in all the final products in which each is used, (2) the possibilities of substituting one material for another, (3) the relative scarcity of each, (4) their own costs of production, and (5) the extent of control of the market by those controlling these resources. These prices appear as <i>costs of production</i> in all subsequent stages.

CONSUMERS' GOODS	INDIRECT SERVICES	INDIRECT AGENTS	UNFINISHED MATERIALS	ULTIMATE RAW MATERIAL AND SERVICES
Food	<i>Merchandising</i>	<i>Specialized</i>	<i>Iron, metals</i>	<i>Mineral</i>
Housing	Retail	<i>machinery</i>	<i>and mineral</i>	<i>Resources</i>
Heating	Wholesale	Presses	<i>products</i>	Iron ore
Electricity	Jobbing	Tools	Steel	deposits
Gas and Water	Commission	Lathes	bars, plates,	Copper
Furniture and		Locomotives	shapes,	deposits
equipment	<i>Transportation</i>	Rolling stock	ingots,	Other metallic
Clothing	Rail	Looms	forgings,	ores
Automobiles	Water	Blast	etc.	Coal reserves
Tires	Air	furnaces		
Gasoline	Motor	Rolling mills	Copper —	<i>Agricultural</i>
Oil		Generating	bars, sheets,	<i>resources</i>
Luxuries, etc.	<i>Banking</i>	<i>machinery</i>	wire, etc.	Cotton land
Entertainment	Commercial	Power Plant	Lead, tin, etc.	Wheat land
Personal	Investment	equipment	in refined	Grazing land
services		Transmission	form	Timber land
Professional	<i>Insurance</i>	lines	Coal	Rubber plan-
services		<i>Unspecialized</i>	<i>Agricultural</i>	tation
		<i>machinery</i>	<i>products</i>	Sugar
		<i>Land</i>	Cotton	plantation
			Wheat	
			Wool	<i>Fisheries</i>
			Sugar	
		<i>Buildings</i>	<i>Forest products</i>	<i>Human</i>
			Lumber	<i>resources</i>
			Rubber	Labor
				<i>Water power</i>

the range of choices open to the consumers, or, in other words, upon the prices of the other goods that might be chosen. But the prices of most consumers' goods, in turn, are also related to each other through the prices of the indirect agents employed in producing them. The latter prices appear as costs of production to the manufacturers of consumers' goods, although such prices, in turn, depend upon the aggregate demand for the consumers' goods.

The price system, then, comprises a vast number of intricately related prices, so linked together that a change in consumers' choices at any one point is likely to produce far-reaching shifts and repercussions. For the same reason, a change in methods of production, a new invention, the discovery of new sources of supply of particular resources, the exhaustion of other resources, a change in the population, or some other similar circumstance, may produce a dislocation of existing relations and necessitate extensive and sometimes painful readjustments.

Effect of Monopolistic Conditions on Allocation of Resources. The existence of conditions of monopoly, oligopoly, or monopolistic competition in the production of goods and services affects the extent and manner of utilization of the indirect agents of production.³ A monopolistic producer will ordinarily maximize his net revenue by producing a more restricted output than a firm with the same facilities would pro-

³ It has already been pointed out that, in restricting output to maximize revenue, the monopolistic gain constitutes a loss to the consumer. See above, pp. 28-29 and 236-237.

duce under conditions of pure competition. This restriction of output under monopolistic conditions is reflected, in turn, in a limitation of the requirements for human services, raw materials, and other agents of production. The human services presumably have alternative employments but the existence of monopolistic conditions in various industries will alter the distribution of workers among different occupations. It will also tend to reduce somewhat the rate of wages paid in certain industries.

Similarly, the restricted use of certain raw materials purchased by the monopolist may affect the prices of those raw materials. The extent to which it will do so depends on the proportion of the total output of a certain raw material that enters into the products of the monopolistic producer as compared with the part used in other more competitive industries. Under purely competitive conditions a larger quantity of the raw materials would tend to be used, at a somewhat higher price, and the finished product would tend to be sold to the consumer at a somewhat lower price. Thus, monopolistic production may be judged to be economically less efficient than competition in achieving the maximum of human satisfactions with a minimum expenditure of human services and material resources.

It should be pointed out, however, that viewed over a longer period of time some limitation upon the utilization of certain types of exhaustible supplies of raw materials, such as timber resources, coal reserves, and the like, may be socially desirable. In these instances,

therefore, production under monopolistic conditions conceivably may be more economically efficient than under those of pure competition. In still other circumstances, exemplified in the public utilities, the duplication of facilities would be inconvenient and would result in less efficient operation. In all such cases, single operation is preferable, from an economic standpoint. The problem is to insure the accrual of these advantages to society as a whole rather than only to those engaged in the industry itself.

In the utilization of the durable agents of production, such as plant, machinery, tools, and equipment, monopolistic conditions tend to lead to a restriction of their use, and to the existence of a larger degree of unused capacity than would be the case under pure competition. Consequently, the phenomenon of "excess" capacity tends to be more striking under monopolistic than under competitive conditions, representing a less efficient utilization of resources than would tend to prevail under pure competition.

It must be noted that under conditions of monopoly there might be less tendency, when demand is shifting positively, for an overbuilding of plant and equipment to occur. This latter statement applies only to conditions of pure monopoly; for, under oligopoly or monopolistic competition, the existence of the excessive returns of the monopolist constitutes a continuous motive for producers to enter the industry. This may lead to a constant tendency toward the building of over-capacity for the industry.

EQUILIBRIUM IN A DYNAMIC ECONOMIC SYSTEM

Dynamic Change and Dynamic Equilibrium. A dynamic, as contrasted with a static, economy is one in which cumulative changes, either progressive or retrogressive, are taking place in important parts of the economic environment. Population growth or decline, technological changes, developments in human institutions and habits of life, the discovery of new resources or the exhaustion of old, are all typical examples of dynamic change. Such cumulative or dynamic changes tend to produce permanent alterations in the whole structure of the price system and consequently in the structure of industry, through changes in economic activity motivated by the changing relations between prices and costs. Inasmuch as changes of this sort require time for their unfolding, the study of the dynamic problems of economic society is concerned with longer period adjustments.

The equilibrium toward which economic forces may be said to be driving productive activity in a changing economy *is itself dynamic*; that is, the equilibrium itself changes with the passage of time. Dynamic equilibrium may be conceived of simply as *co-ordinated economic development*. A world in dynamic equilibrium would be one in which many changes were taking place at the same time, yet in perfect harmony with one another. Thus, if at a particular moment all movement were arrested, it would not be possible for any individual to discover a way of changing his con-

sumption or productive activities that would be to his own advantage. Simply to state the conception is sufficient to show the improbability of attaining or maintaining such a condition of moving harmony. Yet, it may serve in some respects as a means of visualizing the interaction of economic forces that does take place.

The influence of dynamic changes may perhaps be illustrated by comparing them to low-pressure areas as shown on a weather map, toward which air currents are constantly moving. These centers of meteorological disturbance are themselves constantly moving along fairly well-defined paths, producing a variety of weather in any particular area of the country. In the same way, dynamic changes are constantly producing opportunities for profitable enterprise (low-pressure areas) toward which the currents of economic activity are shifted. This has a tendency, never fully completed, to bring about an equalization of opportunities of enterprise throughout the system, just as the flow of air tends to equalize the barometric pressure over the entire area. Other dynamic changes may, of course, produce the opposite effect, and set in motion a shift away from particular types or fields of economic activity.

PARTIAL DISEQUILIBRIUM

A CHARACTERISTIC OF THE DYNAMIC ECONOMY

The Significance of Change and Uncertainty. Change does not of itself necessarily cause general disequi-

librium in the price system, because co-ordinated or harmonious change is conceivable. Disequilibrium, either partial or general, arises as a joint consequence of change and uncertainty in a system of production for future wants. Uncertainty arises from the fact that dynamic changes occur over a period of time. The ultimate extent and duration of many of the most important types of dynamic change are veiled in uncertainty. Even after their initial appearance, it is frequently impossible to forecast the duration or extent of some types of dynamic change.

In certain instances, to be sure, very accurate predictions can be made of changes covering a period of a few years, and fairly accurate estimates can be made for longer periods, as exemplified in the forecasts of the total number, sex, race, and age composition of the population of a country. The distribution of the people within a country, however, or the number of people in various occupations, cannot be predicted with the same degree of confidence, because such changes depend on a variety of factors that do not occur in a regular manner.

There is virtually no possibility, however, of predicting some types of future events that may profoundly influence the entire economic system. Important inventions, technological innovations, the discovery of new sources of supply of natural resources, natural disasters such as floods, fire, and drought, or the outbreak of wars or economic strife, occur without a previous fanfare of trumpets.

Uncertainty exists not only because of inability to

forecast the nature of the dynamic changes that are in progress in the material world. It exists also because the extent and effect of the activities or reactions of people in attempting to deal with changing conditions is not known. Such uncertainties arise in a variety of ways, although they are magnified by the inadequacy of the information available to the individual and by his failure to make use of such information as may be at his disposal. If, for example, a new product that appeals to the public taste is developed, the profits derived by the sponsors of the innovation may induce over-optimism among profit-seeking enterprisers and consequent overexpansion of that industry.

The Necessity of Making Productive Outlays in Advance. Neither dynamic change nor uncertainty with respect to the future course of such changes would lead, however, to a substantial degree of dynamic disequilibrium were it not for the fact that the processes of production require time for their completion.

The consequent necessity for making productive outlays on the basis of estimates of the future constitutes the immediate source of dynamic disequilibrium. Such disequilibrium arises when productive undertakings, as they mature, fail to square with the contemporary demands of the market. Production may either overrun or fall short of the actual demand at a price sufficient to cover costs. In a system involving the three factors, dynamic change with the passage of time, uncertainty, and the necessity of future commitments, the occurrence of partial and general dynamic disequilibrium is virtually inevitable.

*PARTIAL DISEQUILIBRIUM AS A STIMULUS
TO ECONOMIC ACTIVITIES*

Partial disequilibrium is thus the consequence of the failure of past estimates, in a particular industry, to square fully with reality. But it also constitutes the setting in which efforts are made to readjust economic activities in the light of current estimates of the requirements of the future. Viewed in this manner, economic activities represent efforts to connect two chains or sequences of events: first, the sequence of actual conditions; and second, the sequence of expected events on the basis of which people must plan. In the known conditions of the present, people must estimate the probabilities of the future, and plan accordingly. As, with the passage of time, the future becomes the present, the actual conditions revealed may either confirm or invalidate the estimates that have been used as a basis for productive undertakings. The degree of partial disequilibrium existing in a given industry at any time may be regarded as an index of the inaccuracy of past predictions with respect to that industry.

An expansion of production is based on the belief that the demand for the product, when completed, will be sufficient to absorb the output produced, at a price sufficient to cover the costs of production and, in addition, to afford a profit. In other words, new undertakings are stimulated by the existence of a prospective disequilibrium of the supply of and demand for that product. If, on the other hand, prices are, or are expected to be, inadequate fully to cover costs, or if

greater gains could be made by an alternative form of economic activity, an incentive exists for shifting the employment of indirect agents so as to bring demand, supply, prices, and costs once more into equilibrium with each other.

Such changes in the utilization of labor and resources frequently require time for completion, and seldom can be accomplished without loss. Thus, considerable periods of time may elapse before the conditions producing disequilibrium in a particular industry or group of industries are fully corrected or compensated.

SELF-PERPETUATING DISEQUILIBRIA

A study of changes in prices and production in certain industries shows that such changes tend to follow comparatively regular cyclical patterns which bear a definite relationship to each other. A period of high prices and low production will be followed, some months or some years later, by an opposite situation, with a high volume of production and low prices. This will be followed, after about the same interval, by another period of high prices and low volume, and so on. Such cycles have been traced for cattle and hogs, dairy products, asparagus, strawberries, and other agricultural products. In an attempt to build up a logical explanation of these cycles, certain theorists have formulated what is known as the *cobweb theorem*.

The Cobweb Theorem. The cobweb theorem is not advanced as an explanation of price and production variations in general. It is suggested as an explanation of fluctuations in the price and output of goods pro-

duced under conditions conforming to certain specific assumptions, of which the following are the most important:

(1) The commodity must be one involving a definite period of production, within which it is impossible to make significant changes in the volume of output. This is, of course, most frequently true in agriculture, because when a crop has been planted (or, in the case of livestock production, when a breeding program has been undertaken) it is impossible to change markedly the volume of output that will be obtained at the end of the production period.

(2) There must be no substantial stocks in storage or in the hands of the middlemen to exert an equalizing influence on production and prices.

(3) The producers must be so numerous as to take no account of the indirect effects of their individual actions. It is also assumed that they base their undertakings on the supposition that current prices and costs will continue substantially unchanged until the products have been matured and marketed.

On the basis of these assumptions, three different possible situations with respect to variations in prices and production may be distinguished, depending upon the character of the "normal" behavior of demand and supply. These three situations are shown in Figure 32 on page 380.

The first diagram represents the situation that would prevail if the slopes of the supply curve and of the demand curve were equal; that is, if the negative slope of the demand curve were equal to the positive slope

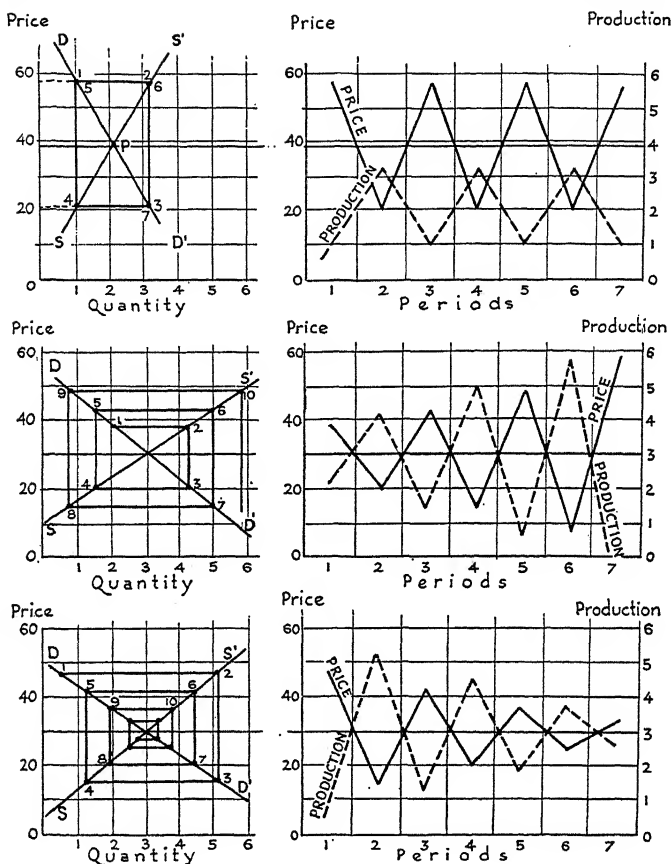


FIGURE 32. ILLUSTRATION OF THE COBWEB THEOREM

of the supply curve. Suppose that for some reason the volume of production fell short of the equilibrium output, with the effect of displacing the price, for the moment, from the equilibrium position P to point i

on the demand curve. The price would remain at this point, for the time being, because the output could not be increased until the following production period had been completed. The belief that the higher price would continue would lead producers to expand their undertakings, because (under the assumed supply curve) they would be willing at that price to produce the quantity indicated by point 2 on the supply curve.

This enlarged quantity would actually be placed on the market during the second period of production, as indicated in the right-hand diagram. The producers would then discover, to their chagrin, that the buyers would take all that was produced only at a lower price, indicated by point 3 on the demand curve. But the producers would be unwilling to continue production on the enlarged scale at that price. Rather, they would be led to restrict their production, in the next production period, to the extent indicated by point 4 on the supply curve.

The effect of this curtailment would become evident during the third production period. It would then be found that output was short relative to demand, because the buyers would be willing to pay, for the restricted quantity, the price indicated at point 1. This would complete a cycle of production, with a restoration of the initial condition of high price and short supply. Barring any other influence, the cycles would continue indefinitely with alternate periods of high and low prices offset against low and high production, as indicated in the right-hand diagram.

The second case does not require extended descrip-

tion. It reflects the assumption that the demand curve is more steeply sloped than the supply curve. This means that a given change in price would lead to a larger change in the quantity offered for sale than in the quantity demanded. In such a case the initial shortage of supply and the high price (indicated by point 1) would lead to a proportionately greater change in supply (indicated by point 2). This would lead to a drop in price to point 3 and, in turn, to a more severe restriction of supply to point 4. At the end of the cycle, prices and production would be further from equilibrium than at the beginning. This would lead to ever more violent swings in price and production, from one production period to the next, as indicated in the diagram of price and production changes. These swings would continue until some external influence brought a break in the sequence.

The third case is the opposite of the second. It is based on the assumption that demand is more responsive to price changes than is supply. Under this assumption the fluctuations from one period to another would tend to become less and less violent and approach the equilibrium point, assuming that the process was not interrupted by external forces.⁴

⁴ An interesting example of this sort of analysis is afforded by the study of pig production in Great Britain made by the Reorganization Commission for Pigs and Pig Products, published in 1932. The commission concluded, from its study of the industry, that the chief factor influencing the volume of production at any time was the current expectation of profit or loss by the producers, and that the majority seemed to proceed on the assumption that current relationships between prices and costs would continue. Thus they were accustomed to take steps to increase or decrease production when feedstuffs were cheap or dear relative to pig prices. When it was thought that bacon prices were high as compared with feed prices, breeding activities tended to

The mechanical interactions that are assumed in this simplified statement of the cobweb theorem are modified in reality by other considerations that also influence producers' decisions, and by the fact that there is in every industry some possible flexibility in technological arrangements. Thus, the cyclical pattern of disequilibrium in a particular industry may be obscured or dampened by (1) the existence of stocks in the hands of middlemen or others, which will tend to influence the movements of prices; (2) the possibility of modifying the volume of production within the production period, even though outlays have already been made; (3) the recognition by some producers, if not by all, of the possibility of future changes in the relationships of costs and prices.

It would probably be more realistic to visualize but two types of self-perpetuating price disequilibria in

expand, eventually leading (many months later) to an increase in the volume of marketing. When the increased relative supplies resulted in lower prices for bacon and other meat, the reduced profits tended to be followed by reduced production in the subsequent breeding season. There would then be a return to higher prices, with a renewed stimulus to expansion in the succeeding season.

It should be noted, however, that the conclusions of the Reorganization Commission have been sharply questioned by other students of the industry, especially with regard to the assumption that the producers do not recognize the possibility of changes in the price-cost relationship in the course of the production period, and the other vital assumption that they cannot vary their undertakings if prices change. It was pointed out that even within the span of a production period the producers can, within limits, bring about an adjustment of production either to increasing or decreasing prices. Such activities were encountered especially among those engaged in fattening young stock for the market. The cycle was, in consequence, attributed to variation in foreign demand. See Coase, R. H., and Fowler, R. F., "The Pig Cycle in Great Britain", *Economica*, Vol. II (1935), pp. 142-167; and by the same authors, "The Pig Cycle in Great Britain: An Explanation", *Economica*, Vol. IV (1937), pp. 55-82.

particular industries, namely the *divergent* and the *convergent* types, because of such modifying influences as those outlined above. The whole question of whether the resulting cycles will tend to be divergent or convergent probably depends at least as much upon modifying factors of this sort as upon the period of production or the "normal" behavior of demand and supply. It is likely that the cycles in prices and production will be convergent if producers or speculative middlemen accurately estimate the prospects of the future, and will be divergent if their estimates are faulty.

PARTIAL DISEQUILIBRIUM AND COMMODITY STOCKS

Accumulated stocks of goods, and unused capacity, are regarded in general as indications of economic maladjustments, but this is not true under all circumstances. Before goods can reach the hands of consumers, some stocks must be acquired by retailers, wholesalers, and other middlemen, in order to meet the variations in day-to-day demands. Stocks of such finished products also are usually held at the mills and factories, awaiting sale through the accustomed channels. Moreover, stocks of raw materials and semi-finished products of all sorts are to be found in the hands of manufacturers, warehousing agencies, or even the producers of these materials.

Raw Material Stocks. The production of some raw materials is so completely unadjusted or unadjustable to the normal flow of consumption that large stocks must be accumulated at some seasons to take care of

subsequent needs. This is true of most agricultural commodities. Climatic conditions also affect the production and shipment of iron ore and some other mineral products in this country, so that the greater part of the annual output is produced in a few months.

Where the materials can be cheaply stored, without great fear of loss through deterioration or through changes in style or productive methods, the accumulation of stocks to enable the continuation of manufacturing activities throughout the year may be quite advantageous.

Finished Goods. In some cases raw materials are produced seasonally but cannot be stored in the raw state. Manufacturing processes must therefore be concentrated within a short period, and the stocks of finished products held until the marketing season arrives. This is especially true of the canning industry. In other instances, manufacturers adopt the policy of storing stocks of finished goods as a means of smoothing out the effects of seasonal fluctuations in the demand for their product. Various types of clothing, paper products, sporting goods, and Christmas articles of many varieties, exhibit pronounced variations in demand at different seasons of the year.

Stabilizing Aspects of Accumulation of Stocks. Within limits, at least, such adjustments in stocks held are desirable. The accumulation of stocks may be employed not only as a means of adjusting production and consumption seasonally, within a given year, but may also be utilized as a method of leveling out changes over somewhat longer periods.

To the extent that storage regularizes production, it may facilitate the production of a given quantity of output with a smaller aggregate of plant and equipment than would be required to meet the peak demands under unregularized conditions of production. However, the costs of storage, or the hazards of loss through style changes, deterioration of product, or changes in price during the period of storage, may be more than sufficient to offset the advantages thus to be gained.

Speculative Aspects of Accumulated Stocks. The possibility of speculation entering as a factor in the accumulation of stocks may tend to unstabilize, rather than regularize, production. If, for example, there is a feeling on the part of distributors that the retail prices of a particular commodity are likely to rise, they are tempted to load up as far as possible with an inventory of goods in anticipation of these changes. If, on the other hand, the distributors anticipate a decline in retail prices, they will go to the opposite extreme, reducing inventory to a minimum and operating on a hand-to-mouth basis to avoid the risk of loss on goods in stock, should the expected decline materialize. In this way fluctuations in consumer demand and in prices are intensified in their effect on the producer.

Accumulation of Stocks as a Source of General Instability. In periods of declining business activity there is always some tendency for producers to support the prices of certain types of commodities (especially raw materials such as coffee, copper, wheat, and cotton) by holding current production off the market. But sooner or later the accumulation of larger and larger

stocks becomes financially, physically, and psychologically impossible. The disposal of the accumulated stocks then becomes necessary. Prices are likely to be depressed, and production curtailed to a greater extent than otherwise would have been required.

Wherever substantial stocks of materials or unsold finished goods are accumulated, the possibility that the stocks may come to exercise a disturbing, rather than an equilibrating, influence is always present. This is especially true if the rates of production and consumption diverge materially, or if business contraction in general is occurring. In such periods, accumulated stocks are likely to prove a source of serious embarrassment.

PARTIAL DISEQUILIBRIUM AND UNUSED PRODUCTIVE CAPACITY

Unused versus Excessive Productive Capacity. Under dynamic conditions, unused productive capacity is to be found in almost every industry. Technological development leads to the existence of large amounts of obsolete equipment which, though still physically capable of use, nevertheless remain idle except in periods of heavy demand for the product. Some industries appear to be greatly overexpanded, but it is very difficult to judge how much of the equipment would ordinarily be used, and how much of it is simply retained as stand-by equipment for use in emergencies or to meet peak demands. A certain amount of unused capacity, moreover, would commonly be built into a new plant, to allow for the growth of demand during

its life, even though this might give the appearance of waste capacity for several years. Unused capacity arising from such causes should not, presumably, be regarded as "excessive" capacity.

On the other hand, capacity greater than that required to meet the peak demand for the use of the facilities, or more than sufficient to allow for the growth of the industry, would be "excessive." The existence of substantial overcapacity in an industry, like heavy accumulated stocks of commodities, constitutes a phase of partial disequilibrium. Where such unused equipment is very durable, long periods of time may be required before the effects of the excessive investment have been fully corrected. The length of time involved in readjustment to rapid increases in demand, on the other hand, depends on the time required for the construction of the durable agents in question.

Where Capacity Is Quickly Adjusted. If the length of life of a durable agent is comparatively short, persistent excess capacity is unlikely to prevail. Under such circumstances, the annual production of the durable agents will constitute a significant fraction of the entire group of agents of that kind in use. This is true even of such relatively durable agents as motor trucks, busses, and similar types of equipment with a substantial annual turnover. Obsolescence as well as the physical deterioration of the agent in question may give rise to relative shortness of life and high annual turnover.

Under such conditions, an increase in the demand for the use of a given type of durable agent, reflected

in a rise in its price, will ordinarily elicit a positive shift in the supply. The annual production of the agent in question will be increased. At the same time existing units will be used more intensively, and units scheduled for scrapping will be repaired and held for temporary use, pending the completion of new units. On the other hand, a fall in current demand for the uses of such an agent will reduce the volume of purchases of new equipment for replacement purposes, while obsolete or worn out units will probably be scrapped somewhat sooner. Thus, in either direction the number of agents currently available for use is capable of comparatively rapid adjustment to changes in demand. The price of the agent will therefore tend to come fairly rapidly into equilibrium with the cost of producing it and excess capacity will be a purely temporary phenomenon.⁵

Where Capacity Is Adjusted Intermittently. In some instances durable agents are capable of comparatively rapid duplication, in response to an increase in their price, but are not equally responsive to declining prices. This class includes a large part of the mechanical equipment of industry, as well as a significant part of building construction. Such a situation exists wherever the period required to produce the indirect agent is short, relative to its expected working life.

It requires a year or perhaps two to build, for example, a factory, office building, or warehouse—in

⁵ Whether or not the price would equal the cost would depend on the conditions under which it was produced. In any event, equilibrium would be attained when the marginal revenue obtainable by the producers of the agent equaled their marginal costs.

direct agents that may have a lifetime running into several decades. When the rents of such agents rise, an immediate stimulus is afforded to new construction. But if the rents of such agents, and therefore their prices, tend to decline, the number of agents available for use does not decline in any substantial degree. An example of this situation is afforded by houses or apartment buildings constructed to be rented. Once these structures have been erected there is no way of reducing the number available, in the face of lower rents, until those already standing have worn out, burned down, or become obsolete.⁶

Whether conditions among the owners of such agents are competitive or monopolistic, the adjustment of supply to changes in demand accompanying the upward or downward swing of business fluctuations is affected by the fact that the stock of durable agents in existence does not readily become adjusted to changes in demand. There is every likelihood that, in periods of expanding business activity, the requirements of industry for durable plant and equipment will be overestimated. This will lead to the construction of facilities that cannot be employed to full capacity on a basis remunerative to the owners. The durability of such equipment will retard the process of adjustment to equilibrium. Under conditions of pure competition, the equipment will tend to be used to capacity, although its rents may be inadequate to pay the prevailing rate

⁶ In a depression many obsolete buildings are torn down in order to reduce taxes, and a common sight during the long depression of the 1930's, even in New York City, was the use of such land for parking lots.

of interest on the original investment. If conditions of monopoly or monopolistic competition exist among the owners, much of the equipment may remain unused, depending upon the extent of utilization that is most remunerative to them.

CONCLUSION

Dynamic change, in the form of a technological improvement or a shift in the consumption of a particular good, results in partial disequilibrium. The compensatory adjustments that follow tend to establish for the industry a new partial equilibrium in price and production. Under certain conditions, such as those assumed by the cobweb theorem, the reactions to partial disequilibrium are cyclical in character, and retard or prevent the attainment of a new equilibrium. Where adjustments in productive activity to changes in prices and costs can be made promptly such oscillatory movements are likely to be minimized.

The existence of disparities between the prices and costs of production of different commodities, constituting partial disequilibria, smaller in some and larger in other industries, afford the profit prospects or incentives to enterprisers to redistribute economic activity. Thus partial disequilibrium within particular parts of the price system is constantly leading to new adjustments of enterprise toward a never-achieved, ever-changing general dynamic equilibrium.

C H A P T E R X V I

The Business Cycle

TYPES OF ECONOMIC FLUCTUATIONS

SINCE the beginning of the modern era the recurrence of periods of great economic distress, alternating with periods of marked business expansion and prosperity, has come to be more and more clearly recognized as a characteristic feature of the economic system. Because these economic fluctuations have occurred at fairly regular intervals, and because they involve certain typical reactions within the economic system itself, they have generally been referred to as the "business cycle." These major periodic movements in business activity, affecting an entire country, and in most instances the entire world, usually cover a period of from six to twelve years from "peak" to "peak."

In addition to this "major cycle", certain other cyclical changes of fairly regular occurrence are also revealed by a careful study of movements in business

activity, either in particular industries or over still wider areas. In certain industries, or in the consumption of certain commodities, very regular changes in production or consumption occur from month to month or season to season within the year, the same general pattern being revealed year after year. Such movements, as already indicated in earlier chapters, are called "seasonal variations." A third type of cycle, usually lasting from thirty to forty months from peak to peak, affecting activity in many industries or an entire region, is referred to as the short cycle, or "minor cycle."

Concurrently with these cyclical movements, long-term "trends" of growth or decline affect particular industries or general business activity as a whole, over considerable periods of time. In particular industries this element of growth or recession accompanies the rise of new products or the decline of old ones as they are superseded by the new. Long-term trends in general business activity reflect such forces as changes in population or variations in the pace of general economic development.

Figure 33, on page 394, shows the volume of factory production in the United States from 1899 to 1934. The major cycle may be identified clearly by the recurring periods of low business activity. The most pronounced recessions occurred in 1907-1908, 1913-1914, 1920-1921, and 1929-1932. Superimposed on this cyclical movement are minor fluctuations that give the chart its characteristic jagged appearance. The long-term trend or growth element is represented by the rising line drawn

through the curve of factory production, to indicate the steady increase in the "normal" volume of production throughout the period represented by the chart.¹

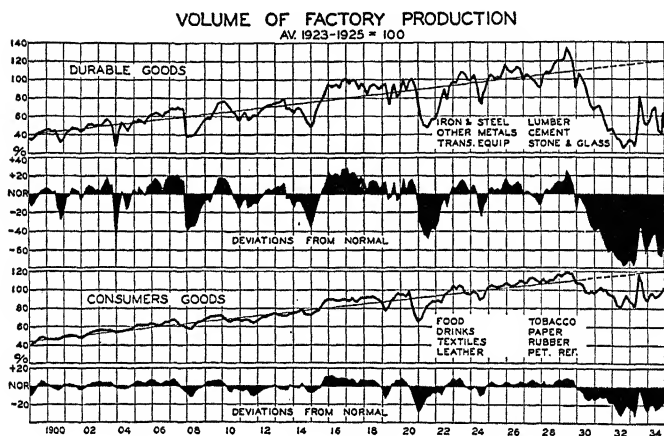


FIGURE 33

Reproduced from Ayres, Leonard B., "The Chief Causes of This and Other Depressions," The Cleveland Trust Company, 1935, p. 32, by permission.

Many interesting problems arise in connection with the study of seasonal variations in particular industries, but they lie beyond the scope of this book. For the most part, such variations are capable of prediction, and it is possible, within limits set by technological considerations, to adapt business activities to them. They

¹ Seasonal variations are not revealed in this chart, because the seasonal patterns differ from industry to industry. The variations in different industries are therefore concealed when figures on volume of factory production for several industries are averaged together.

do not raise problems of major importance in the functioning of the entire economic system.

The same thing is true, generally speaking, of the minor cycle. It is probable that minor cycles, like seasonal variations, can be related, in large measure, to the physical conditions of production and to temporary changes in demand patterns. One hypothesis is that the minor cycle reflects a tendency for cyclical variations in production and prices in particular industries (described in the preceding chapter) to fall into synchronism with each other. While there is no proof that this actually occurs, it seems reasonable to suppose that when commodities that are capable of substitution for each other are subject to cyclical changes in prices and production, the linkage between their uses will tend to pull the cycles into synchronism with each other.

The minor cycle is not a phenomenon of paramount economic importance. It does not lead to vast unemployment or raise problems of large-scale relief. If it were the only kind of cycle present in the economic system, the whole question of economic disequilibrium would not be so serious. Moreover, if this were the only kind of cycle that existed, it is quite probable that business activity could adjust itself to such oscillations, just as it has succeeded very largely in doing for seasonal variations.

The remainder of this chapter will be confined to a description of the typical features of the major, or six-to twelve-year cycle, and to a brief survey of some of the causes to which it has been attributed.

PHASES OF THE MAJOR CYCLE

A study of the history of the business cycle quickly leads to the conclusion that, although no two cycles are precisely alike in specific details or duration, they are all characterized by several distinct phases, which follow each other in regular succession. A period of rising business activity is transformed into a *boom*, with business proceeding at an accelerating and feverish pace. The peak of the boom eventually is succeeded by a *crisis*, which, in turn, is followed by a period of rapid business decline and *depression*. In the course of time the trough of the depression is passed and business *recovery* begins. Eventually, increasing business activity and prosperity generate a boom once more, and so the cycle continues repeating itself. The phases of the business cycle are thus referred to as the boom, the crisis, the depression, and the recovery. A somewhat more detailed description of these successive phases will facilitate the discussion of the causes that contribute to such industrial fluctuations.

Development of a Boom. A period of boom represents the final stage of a period of increasing business activity and prosperity of several years' duration. The upward movement in business activity and profits rouses general business optimism, and even brighter prospects of profits are envisioned by business men, promoters, speculators, and others. Existing undertakings expand, and new ventures are hastily initiated.

As the boom nears the climax, however, doubts arise that business can continue at the existing pace. The completion of new plants and the expansion of old begin to be reflected in enlarged offerings of goods on the market. The addition to total output, moreover, is found to involve increased rather than decreased average costs, because variable costs are tending to rise. Meanwhile a further advance in prices of finished products is usually limited by the failure of the expected increased demand to materialize. Variable costs tend to rise because wage rates, which lag in periods of recovery, eventually begin to overtake the upward trend in other prices. Raw materials also increase in price, in response to speculative buying by over-optimistic producers. Interest rates, which have been slowly rising during the period of recovery, continue that tendency with even greater speed as bank loans are expanded toward legal capacity.

In the later stages of a boom, therefore, the demand for producers' goods begins to moderate. Necessary replacements of equipment have been made, stocks of goods have been replenished by merchants, and as costs continue to rise producers hesitate to buy for the future. The demand for consumers' goods is usually strong, however, for employment conditions are good and wages are high. Consequently, prices of consumers' goods during the boom usually remain high, but do not advance further. With these relatively stationary prices, the rising costs described above reduce current and prospective profits. The producers' optimism begins to be tempered by the diminishing prospects of profits,

and some apprehension for the future appears among the more thoughtful business men. Though production may be rushed on orders already on hand, uncertainty with respect to the future tends to curtail purchases of materials and equipment for future use.

Crisis. The spread of uncertainty and doubt would probably be sufficient alone to induce a change in the cycle, but often at this stage the crisis is precipitated by the failure of some large bank or business house, or of several of them at once. Failures of smaller firms have been increasing, perhaps, for some time.

The stage of crisis is usually heralded by an abrupt collapse of speculative values in the security markets. Stock prices reflect the capitalized earnings of a business, but in the last stage of boom they frequently involve the capitalization of inflated prospects due to the prevailing over-optimism. As earnings or prospective earnings decrease, and as the rate of interest rises, the values of securities in the market are undermined. Speculators and others, seeing that stock prices are weakening, are apt to become panic stricken. The selling rush that follows drives prices to extremely low levels. This downward movement is aggravated by the fact that, as stock prices tumble, bank loans previously advanced on stocks as collateral are called for repayment, bringing about a vast quantity of "forced selling" in the market.

The "forced selling" of securities spreads to forced selling of speculative commodities and real estate as well, and the crisis becomes a "vicious circle" of deflation that gathers momentum within itself. Profits

decrease further, leading to still further declines in security prices and additional liquidation. This phase of the cycle is characterized by distress interest rates, reflecting the extreme urgency of the demand for current funds to prevent further liquidation.

The demand for indirect agents, and in lesser degree for consumers' goods, decreases with the general realization that a turn has come. Producers and distributors attempt to get rid of their stocks of goods before prices fall. This very effort to liquidate, coupled with the decrease in demand, brings a drop in commodity prices. With diminishing orders and vanishing profits, the confidence of business men gives way to fear. Production is curtailed and many workers are thrown out of jobs. This removes from the market a considerable part of the demand they might have had for goods and so promotes still further deflation.

Depression. Such a situation typifies the early stages of a depression. Users of both producers' and consumers' goods are reluctant to buy. Consumers, oppressed by the constant fear of losing their source of income through loss of employment, seek to conserve their savings and, if possible, to increase them, if they continue to earn current income. All possible cuts are made in expenditures. Shoes are resoled instead of replaced; the old car is used for another year or two; the proposed vacation is indefinitely postponed.

Producers, expecting a continued decline in prices, hesitate to buy even needed goods until the prices reach bottom. They, too, seek to conserve what they have. On the books, a cotton mill may have completely de-

preciated its machinery, but so long as the machines will work, even though inefficiently, they are retained rather than replaced. Railroads and other large purchasers of durable equipment make reduced provision for replacement. Construction work practically ceases, for potential builders see no certainty of a future income from rented properties when plants close, stores fail, and unemployed workers vacate houses and move in with relatives.

Fixed charges (that is, contractual costs of production) frequently do not fall as rapidly as other costs and prices. Interest payments on mortgage debt, rentals payable on long-term leases, and taxes on real property, remain virtually unchanged while the volume of business declines, and the proportion of the price of the product required to meet fixed charges increases rapidly as the price falls. Even variable costs may not fall in proportion to the decline in output, as economies of the firm or of the industry are diminished with the reduced output. Although continued unemployment decreases the total wage bill of the nation, the wage rates of those still employed fall more slowly.

The consequence is a severe reduction of profits or the incurring of substantial losses. Business confidence is at its lowest ebb as many investors lose their capital in business failures and as production declines, particularly in the producers' goods industries, to a fraction of its former level.

Unemployment rises rapidly as manufacturers, faced with a scarcity of orders, are forced to curtail production. This unemployment further reduces the de-

mand for products and thus causes even more unemployment. The social and economic consequences for the workers are tragic. Deprived of a way of livelihood, the unemployed are first forced to use their savings and then to ask for charity from friends or government agencies. Standards of living are lowered and food, clothing, and shelter become increasingly inadequate. Thousands of young people face life in a world that has no work for them.

Credit rapidly contracts after the crisis. Loans outstanding are reduced as rapidly as possible, and few new loans are made, both because producers hesitate to commit themselves to future obligations, in the light of uncertain markets, and because the banks are hesitant to lend to anyone, for fear of loss in the event of a further decline.

Recovery. Eventually, however, a turn is reached. Consumers who have not lost their employment are forced gradually to replace durable goods they have been using during the depression period. Prices have dropped sufficiently to become attractive even to the slender purses of depression. Producers, who have finally been able to readjust their financial position, begin to see opportunities to remodel important units of productive plant for the future.² Business firms begin to replace and repair machines and equipment, allowed to deteriorate during the depression, as signs of buying begin to develop. Railroads order new ties, rails, and

² Some of the greatest and most improved steel plants, for example, have been built at the depth of depression. The electrification of the Pennsylvania Railroad between New York and Washington was likewise carried through during depression.

equipment; mills order new machinery to replace worn-out facilities. New products and new methods, born of the stress of the depression, begin to have a widening appeal and to provide prospects of profitable enterprise. Housing, that had been at a standstill for the period of crisis and depression, is urgently needed to care for a population that did not cease to grow, for depressions have only a slight effect on marriage and birth rates.

Investment funds for such outlays are available at low cost. Interest rates are low and the contraction of bank loans during the earlier stages of recession has left the banking system in a stronger position. Furthermore, as business men begin to discover possibilities of profit, and as the bankers begin to see prospects of recovery, loans are more easily negotiated.

Thus demand both for producers' goods and for consumers' goods begins to improve and employment once more to increase. The large stocks of goods that had accumulated during the boom period have finally been liquidated. The retailer needs goods to restock his shelves. The wholesaler must purchase from the manufacturer, so that he can supply the retailer. The manufacturer, in turn, must purchase raw materials and hire labor in order to fill his orders. Furthermore, costs have declined as wages have been reduced and interest rates lowered. Fixed charges have been readjusted to lower levels, and possibly more efficient methods of production have been introduced in some parts of the economy.

The prospect of orders, combined with the low costs of the productive factors, gives the enterpriser hope that once more he may make profits. As production expands, overhead cost remains the same, and increased profits are actually realized, especially if an increase of prices occurs simultaneously. As profits increase, business confidence returns. Production is accelerated and employment increases. This generates more consumer demand and with a rising standard of living economic society once again enters a period of recovery.

BUSINESS CYCLE THEORIES

There is little dispute among economists as to the characteristic features of the major cycle. They are, however, less fully agreed either as to the causes of cyclical business fluctuations or as to the theories advanced to explain the characteristic movements in the cycle. Differences of opinion arise chiefly with respect to the relative importance of the part played by external factors (that is, by events or circumstances that lie outside of the economic structure) as compared with that played by actions and reactions inherent in the structure of economic relationships. Those who place primary emphasis on rhythmic changes in the economic structure may be said to hold "institutional" theories of the business cycle. Those emphasizing the external factors as originating causes find the explanation of the cycle in the conjuncture of chance external factors.

CONJUNCTURE THEORIES

Theories of the business cycle that attribute periodic business fluctuations to the more or less regular concurrence of chance events are termed "conjuncture" theories. They depend, for their explanation of economic maladjustment, on the chance concurrence of events, apart from the economic activities of men. Such events include not only natural phenomena, such as changes in the weather, droughts, floods, and earthquakes, but also occurrences for which man is responsible, such as the making of war or peace, innovation, and social and political changes. Some students holding this type of theory of the business cycle question whether there is any true cyclical element inherent in economic fluctuations, in the sense of some force tending to perpetuate these fluctuations.

They suggest, on the other hand, that the more or less periodic or rhythmical occurrence of booms and depressions is due simply to the chance regularity with which a number of external causes tend to operate. One such event occurring alone might not be sufficient to create a major cycle, but the chance concurrence of two or more of them will produce a major business cycle. It can be shown mathematically or by experiment that the random occurrence of a relatively small number of events, taken in combinations of two or several at a time (representing the conjuncture of two or more disturbing events) will produce a rhythmical pattern.

INSTITUTIONAL THEORIES

On the other hand, many business cycle theorists have sought an explanation for the cycle within the structure of the economic system itself. Although not denying the importance of external forces as factors tending to initiate cyclical fluctuations, they believe that the major cycle would occur whether or not these external events took place. Some members of this group emphasize certain features of the monetary and financial system that permit the alternate expansion and contraction of the supplies of money and credit, and so produce general fluctuations in business undertakings. Adherents of this view usually place a considerable amount of stress on the mass psychological reactions, or changes in "business confidence", that accompany the successive phases of the cycle and tend, within limits, to make the movements cumulative, either upwards or downwards. This tendency to cumulative swings in the different phases of the cycle is referred to as the self-aggravating tendency of the cycle.

Other theorists have been inclined to place greater stress on the operation of the "laws" of distribution as a causal explanation of the cycle. Overproduction, underconsumption, and purchasing-power theories of the cycle as a whole fall in this general group. The general line of argument (with many variations) is that the existing distribution of the social income, in the form of wages, rent, interest, and profits, is such that insufficient incomes pass into the hands of people

who will spend their incomes for current purchases of consumers' goods, and that an excessive amount is saved and invested in the extension of productive undertakings. The consequence is a progressive enlargement of productive capacity and of capitalized business expectations, to an extent not warranted by the actual sales of finished goods to consumers. Depending on the point of view, such a situation may be described as one of overproduction or as one of underconsumption. In either event, miscalculations have occurred, and business depression follows before they can be corrected.

A variant of the consumer purchasing-power theory attributes the cycle to the deficiency of producers' incomes, rather than to reduced consumers' buying. This view is based on the fact, already noted in describing the phases of the cycle, that as business nears the peak of a period of expansion, business profits begin to decline and purchases of producers' goods are curtailed some time before the contraction of consumer buying sets in. Thus the circumstance that brings about the ultimate contraction of consumer purchases is held to be not the insufficiency of consumers' incomes in the period of prosperity, but rather the decrease in spending by durable goods' industries resulting from the insufficiency of producers' profits.

This brief sketch of some of the principal theories of the business cycle is intended simply to suggest the various lines of attack that have been followed in explaining the regular recurrence of major fluctuations in economic activity. The chief distinction between the

conjuncture theories and the institutional theories is that the latter hold that the cycle is caused by economic forces, whereas the former do not. Both groups of theories involve the assumption that once a movement of business expansion or contraction has begun, it tends to continue in the same direction with increasing force for a considerable period. This is based on the fact that certain conditions, inherent in the system, tend to reinforce a movement in either direction, even though they might not suffice to initiate the movement in the first place. This view is reflected in the frequent application of the term "vicious circle" to the successive events in a period of business recession and liquidation, and in the opposite assumption that in a period of recovery favorable developments act and react in a sort of benign upward spiral.

CAUSAL FACTORS IN THE BUSINESS CYCLE

The remainder of this chapter will be concerned with a discussion of some of the more important factors that are involved in the business cycle, either as external, disturbing forces or as internal, aggravating forces. This discussion will not be directed to the proof or disproof of any one of the theories sketched above, but will merely indicate the way in which particular influences may be related to the course of business fluctuations. Consideration will first be given to those factors that are external to the economic system, as

such, and are random or irregular in their influence. Thereafter the discussion will turn to those conditions within the economic system that may appear, either as causes of cyclical changes or as aggravating or modifying influences affecting the severity of cycles already initiated by other forces.

The various causal factors have been classified, for convenience in analysis, into four groups that are listed below. Of these, the first three may be classified as external factors, while the fourth includes the major internal factors.

(1) Natural phenomena, such as droughts, floods, hurricanes, tornadoes, or cyclical variations in weather conditions.

(2) Social or political changes, such as the occurrence of wars, waves of nationalism, the erection of trade barriers, or revolutions, that disturb pre-existing national and international economic relationships.

(3) Technological causes, such as innovations and inventions, that produce dislocations between different parts of the economic system.

(4) Institutional causes, or conditions within the economic system that prevent the immediate self-correction of maladjustments and mistakes in business undertakings. Among these conditions are certain customary types of business arrangements (long-term leases, contracts, and conventional practices) and legal rights or business practices that impair the flexibility of prices and production. Included among the institutional factors are also monetary and credit phenomena.

In general, the institutional factors in the business

cycle are profoundly influential in aggravating or modifying the course of the movement, because they reflect, and in turn react upon, the hopes or fears of the business community. They also affect business judgment and investment policy.

The cyclical fluctuations that have actually occurred are extremely difficult to associate with particular causes. The contributing causes from one cycle to another may be different, and the amplitude, and even the duration, of the cycle may be altered because the influence of a recurring causal event is modified by other forces present. Several causal factors may be represented in any particular cyclical movement, the latter representing the net effect of all causes jointly effective at the particular time.

NATURAL PHENOMENA

In a more primitive stage of economic development, natural phenomena undoubtedly dominated the general economic situation. Natural catastrophes, such as droughts or floods, resulted in widespread famine and suffering as they do today in largely self-sufficient parts of the world. With the development of modern methods of production and communication, these hazards of nature have been mitigated, and other causes of change in economic well-being pushed into the foreground. It is still possible, however, that a widespread natural calamity might so impair the possibility of maintaining the payment of interest, taxes, and other obligations by people in the stricken area as to upset a delicately balanced financial structure and precipitate an eco-

nomie crisis. If the afflicted area were large and important enough its misfortune might induce an economic crisis over the general economy of the nation or even the world.

What relation there may be between cyclical changes in weather conditions and the business cycle is not altogether clear. Favorable weather conditions presumably will result in correspondingly large yields in agriculture, and vice versa, but the prosperity of the farmers is not always proportionate to the size of the crops. Indeed, if large crops prove salable only at low prices, the large crop produced in a year of favorable weather may afford the farmer a smaller income than is obtained when nature is less bountiful. To determine the net influence of changes in agricultural yields, however, it is necessary to consider their effects on other industries.

A large volume of agricultural output would tend to increase the physical volume of trade in farm products and to benefit middlemen, railroads, and others engaged in handling such products. Furthermore, the abundance and low prices of farm products would benefit manufacturers using these products as raw materials, and also consumers of finished goods. The high level of trading and shipping activity would create increased demand for producers' goods and transportation equipment and so contribute to increased prosperity. Thus, large yields in agriculture, accompanied by low prices, might affect the farmers adversely and yet benefit the rest of the community sufficiently so that the adverse effect of reduced farm

purchasing power would be offset by the expansion of other activities.

If, on the other hand, large crops meant, in general, higher farm incomes than were obtainable in years of lower yield, the changes in weather conditions and agricultural yields would react positively both in farm and in urban communities, and the effect on the general level of economic activity would be quite large.

SOCIAL AND POLITICAL CHANGES

War as a Cause. For several reasons, war constitutes a highly important cause of cycles. In the first place, wars are usually financed by inflationary methods. The general rise in prices that occurs during such an inflation involves maladjustments between flexible prices and inflexible prices (those unable to advance because of contractual relations or for other reasons). This creates widespread changes in the position of debtors and creditors, constituting a vast redistribution of purchasing power. Price-cost relationships tend at first to be very favorable to enterprise, as already described, and productive activity is greatly stimulated. Then, as the lagging prices eventually begin to catch up with the general upward swing, the price-cost relationships are reversed, becoming less and less favorable for enterprise. In other words, inflation itself is a sufficiently disturbing element to become a cause of the cycle.

But in addition, war brings about a vast readjustment of economic activity from peacetime pursuits to wartime activities. And when the war is over, there is the necessity of restoring economic activities to a peacetime

basis once more. When war assumes such gigantic proportions as the last world war, it changes the whole trade map of the world. A vast agricultural boom occurred in the United States during that war, first because the European nations had put their working manpower in the fields of battle, and second because the submarine warfare limited the shipment of Australian and South American foodstuffs to Europe. When the war was over, part of the rehabilitation consisted in the resumption of food production in Europe, another part in the restoration of old routes of foreign trade. Thus, in brief, war tends to generate economic maladjustment, for it creates a new set of circumstances on the basis of which economic activities are undertaken. Such war industries are quickly found to be "maladjusted" when war is over and peace restored.

Changes in Trade Restrictions. In a like manner, changes in tariffs and in similar trade restrictions may contribute to the development of the business cycle. In the actual course of history, tariff changes have been comparatively gradual, for the most part, so that economic activity could adjust itself to the available markets. Nevertheless, tariff changes may constitute a cycle-generating cause when made suddenly and drastically. If world trade and the economic activities of the principal nations have come to be adjusted to a given set of international barriers, permitting a given amount of international trade, and some nation or group of nations sharply raises additional barriers, the effect is the same as if a large part of the market had been abruptly destroyed. A vast liquidation in certain

fields of industry becomes necessary; future expectations of exporting industries are radically curtailed, and productive activities must be adjusted to the new set of prospects based upon more restricted markets. Recapitalization of such industries, if extensive, would produce marked strain on the credit and banking system and could precipitate a general wave of liquidation through the initiation of a vicious circle of forced selling.

TECHNOLOGICAL FACTORS

Development of New Resources or New Industries.

In some instances far-reaching changes follow new discoveries of resources, as exemplified by the finding of gold in California, diamonds and gold in South Africa, or petroleum in Texas or California. Not only do such discoveries react upon existing sources of supply and existing relationships in industry; they also induce large shifts of population, and thereby entail extensive economic readjustments. Similar consequences may also result from technological advance, as represented, for example, by the development of the automobile, and the centralization of the automotive industry in Detroit.

Shifts in population, induced by discoveries of resources or technological changes, require the construction of new facilities in the region to which the shift is occurring; buildings and public works of all types are necessary. A shift of population geographically, therefore, creates a wave-like movement in constructional activity. Vast undertakings in the construction of transportation facilities, warehouses, stores, office build-

ings, and residences are required. Some types of existing economic activity are affected favorably, while at the same time others in already settled communities are injured. Eventually, the forces that originated the change spend themselves, or new counterbalancing influences arise, so that the population shift in a particular direction is diminished or ceases, bringing the boom in the new area to an end.

Booms in building activity are important not only for the incentives they offer to expansion in construction and related industries, but also because they tend to render obsolete some of the existing facilities, housing, and productive equipment in other communities. If buildings and facilities as a whole were short lived this would give rise to no serious problems. But, instead, they are durable and investments "tied up" in contemplation of rents extending far into the future cannot be liquidated without loss. Thus, unless a development of new economic activities occurs, giving rise to alternative uses for obsolete construction, investment difficulties are likely to develop and may lead to a financial crisis. This question of the relationship between investment and the business cycle will be discussed in a subsequent section of this chapter.

Influence of Fluctuations in Demand for Durable Agents. A final technological condition to be considered in connection with the business cycle is the possibility of great fluctuations in the production of durable goods from year to year. Such fluctuations may occur either as a result of changes in demand, or

as a consequence of a slackening in the growth of demand.

The annual demand for new durable goods (whether consumers' goods, such as automobiles, or producers' goods, such as heavy machinery) may vary within wide limits, because on the average this demand, both for expansion and replacement, is small relative to the total stock of such goods in existence. For example, from 1929 to 1932, the annual production of motor vehicles declined from 5.6 million to 1.4 million, whereas the number of registered motor vehicles declined only from 26.5 million to 24.1 million during the same period. The number of car registrations was the same in 1930 as it was in 1929, although only 3.5 million cars were produced during 1930, as compared with 5.6 million in 1929.

If there is a temporary decline in demand for products made with durable equipment, or even a slackening in the increase of that demand, the manufacturers of finished goods tend not only to refrain from purchasing equipment for expansion but also to postpone replacement. As a consequence, the fluctuations in the demand for durable goods may greatly exceed the fluctuations in the demand for finished products. This greatly increases the difficulty of predicting the demand for producers' goods at any given time, and may lead to a considerable overexpansion of the industries engaged in producing such goods if the profits of periods of brisk demand inspire the promotion of new ventures or the expansion of old.

INSTITUTIONAL FACTORS

Investment: (1) Failure to Realize Expectations. In previous pages the fact has been emphasized that under modern conditions of large-scale production heavy investments must be made in durable plant and equipment before the finished product can be placed on the market. The inevitable necessity of formulating business plans on the basis of estimates of future demand and variable cost conditions constitutes an inherent source of error in business judgment, both with respect to particular types of economic activity and with respect to general commitments for the future. Errors are likely to extend over wider and wider circles in industry rather than to offset or to cancel each other, not only because many enterprisers find themselves confronted with the same situation, but also because different industries are technically, psychologically, and financially interlocked.

For example, a period of expansion in a particular industry may be inaugurated by some innovation, or by the practical application of some invention to the requirements of the consumers. Once the possibilities of the development are grasped there is a rush to enter the field. Over-optimism leads to an investment of resources in plant and facilities, raw materials and goods in process, larger than necessary to supply the consumer demand that actually materializes. The profit prospects that induced expansion prove to be illusory, and the investment based on them is seen to be excessive.

If disappointing results are experienced by all of the firms engaged in a particular industry, new investment will tend to be restricted, and the already existing equipment will have to be recapitalized at a lower value, on the basis of actual earning power and the reduced expectations of profits. If mistaken investment proves to be widespread, and has been supported in substantial measure by credit, the development of financial difficulties for certain firms may suffice to precipitate a general crisis.

When the producing units are comparatively small and utilize facilities that can be constructed in a short period of time, the reaction of the market as reflected in actual realized profits from sales will afford a comparatively swift check on the expectations of promoters. The brakes will tend to be applied soon enough to prevent marked overexpansion or overinvestment.³ But where the units of production require a long period to reach full capacity operation, the market check of realized profits as against expected profits is delayed in its application. With the trend toward large-scale production, the developmental stage of industrial undertakings has been prolonged, and the problem of faulty investment has become vastly more complex.

Investment: (2) Vertical versus Horizontal Maladjustment. There are two general types of maladjustment: *vertical* and *horizontal*. Vertical maladjustment means disproportionate investment in the production

³ Note that in this discussion the terms "overexpansion" and "overinvestment" are not related to a concept of normal investment that would afford normal profits; they are connected solely with the expectations on which the individual concern was projected.

of indirect agents as compared with the production and distribution of consumers' goods and services. For example, it is possible to have an expansion in the machine tool industries that is disproportionate to the trend in the requirements of the manufacturers that use the machine tools, and to the growth of consumer demand for the ultimate products.

Horizontal maladjustment, on the other hand, may occur if the investment in industries producing certain types of consumers' goods is disproportionate to the investment in other industries producing consumers' goods, in view of the current variety and apparent trend of consumers' demands. Horizontal maladjustment, for example, would exist if the investment of resources in the production of automobiles were out of line with the current demand for automobiles, as compared with the demands for textile products, food products, and other commodities.

Such disproportion in the distribution of resources is indeed a limitation on the potential expansion of total production and total incomes in the community, for it is by productive activity that consumer purchasing power is created. From the standpoint of each industry, all other industry is, either directly or indirectly, the source of consumer demand for its own products. Consumers can buy automobiles, radios, refrigerators, or houses only if they are receiving wages, salaries, rents, profits, or interest from the productive activities of other industries. Therefore, the existence of unused equipment in one industry restricts the total volume of output attainable with a given quantity of

resources, as compared with the total that might be attained were there no disproportion. Mistaken investment commits resources, facilities, and human services to enterprises in which they yield smaller incomes than could have been obtained by a different allocation, considering the actual demands of the consumer.

Money and Credit. Of the various institutional factors involved in the business cycle the most important, under modern economic conditions, is the use of money and credit. Indeed, some cycle theorists base their entire analysis upon the monetary and credit phenomena. In a credit economy, characterized by extensive borrowing for productive purposes, it is possible for larger investments to be made and heavier claims to be built up against the future earnings of industry, than are actually warranted by those earnings. When such a condition of overinvestment (and overindebtedness) exists, current earnings of industry are insufficient to meet the obligations that the owners of enterprise have assumed. The situation is then ripe for a crisis and depression. A crisis, followed by widespread liquidation, may be precipitated by chance occurrences that produce distrust on the part of the creditors, or the debtors, or both.

The whole financial mechanism is intimately connected with the business cycle, both technologically and psychologically. The cumulative upward movement of business activity in a period of business recovery would be impossible without an expansion of long- and short-term loans. Business enterprises borrow money from commercial banks in order to pur-

chase raw materials, pay wages, and meet other current expenses. They sell bonds, stocks, and other securities through investment banks and other financial houses in order to secure funds with which to buy machinery, tools, and other durable productive equipment.

At the same time, these increased outlays, financed largely with borrowed funds, contribute to greater personal incomes in the form of wages, rents, interest, and profits in the producers' goods industries. These enlarged personal incomes, in turn, make possible increased consumer demands for goods at existing prices. Thus, within limits, an upward movement in business activity, based on the extension of continuously expanded credits, is self-perpetuating. Each rise in business activity leads to an expanded demand for goods, and gives rise to profit prospects warranting further expansion.

If for any reason the course of business expansion is checked, current business receipts from sales are not reinvested in raw materials and other agents for continued production, but are used to repay bank loans. Slackened activity in producers' goods industries leads to reduced personal incomes, and a shortage of purchasing power available for the buying of goods is manifested. Thus a check on expansion is converted into contraction.

During a depression bank loans are reduced to very low levels because of the lack of confidence in current business prospects. With the eventual revival of business activity, expanding production and greater in-

comes afford broader vistas of profit. These prospects give rise, at the same time, to demands by businessmen for loans with which to embark on new ventures and to the feeling of confidence by bankers and other lenders that the loans can be repaid. Thus another upward spiral of expansion begins.

Price Inflexibility. A striking feature of the major cycle is the sharp contrast between the responsiveness of prices and production in different sectors of industry to changing conditions during the business cycle. Certain prices (notably those of agricultural commodities) react quickly and over an extreme range, whereas others, including the prices of many manufactured articles, respond much less rapidly. Still others, such as transportation rates, telephone rates, interest rates, or taxes, show very little flexibility in the face of extreme changes in general business conditions.

Some prices are inflexible because (as in the case of leases, mortgages, bonds, or royalties) the terms are fixed by contract for long periods. In other instances prices are stipulated by governmental regulation, as, for example, are public utility or transportation rates. Still other prices are not sensitive to general business changes because those in position to control them feel that stable rather than altered prices will best serve their own interests, whatever the effect on the community at large may be.

The maintenance of certain groups of prices at fixed levels, in periods of general change, may contribute to general economic instability. In the first place, the maintenance of the prices of certain commodities at

fixed levels, when general economic conditions are changing, causes marked changes in the proportion of certain variable costs of production (such as transportation charges) to the price of the product. In the same way the maintenance of interest rates and taxes at unchanged levels severely alters the burden of fixed charges on many enterprises whose products have declined in price, and may force them into insolvency. Such failures may contribute heavily to the loss of business confidence and the general pressure for liquidation during a period of crisis and depression.

Disequilibrium in the economic system may also result from the efforts of business combinations, associations of producers, and government agencies to stabilize the prices of certain commodities. Such measures, even though intended to insure stability, are likely to create cumulative stresses in the price system. If fixed prices retard or prevent the adjustment of prices and production to shifts in price-cost relationships within a given group of related industries, disequilibrium results. Disequilibrium may also arise if fixed prices for certain goods result in disparities between their prices and those of substitutable goods.

The inflexibility of certain prices, moreover, may result in larger variations in the volume of production than otherwise would occur. Negative shifts in demand will be reflected in the smaller quantities taken at the fixed price. If production is not curtailed to the same degree, larger and larger stocks must be held off the market in storage; otherwise the price will decline. Attempts at price stabilization by withholding

goods from the market are likely to break down ultimately of their own weight, because of the increasingly large sums that must be invested in such "frozen" stocks. The ultimate liquidation is likely to be even more drastic if very extensive use has been made of bank loans to finance the holding of goods in storage.

SUMMARY

In summary it may be said that major fluctuations in general economic activity are fundamentally related to changes in expectations of profit. Variations in business prospects may result from circumstances of a chance or accidental character, outside the economic system, or may be due to changes occurring within the system. The external causes include natural phenomena, political and social changes, technological developments, discoveries, and similar events of wide import. Such changes may produce maladjustments, but these are likely to be converted into an upward spiral of boom, or the downward spiral of deflation, only as a consequence of the operation of aggravating forces within the economic system. The aggravation of initial maladjustments is in part due to the existence of institutional factors that prevent smooth adjustment to changed conditions and permit mistaken judgments in the allocation of resources to go uncorrected for considerable periods.

A considerable part of the aggravation of economic fluctuations is attributable to the psychological reactions of men to changes in the economic conditions surrounding them. These reactions are influenced by the

forces of mass psychology, as evidenced in the abrupt changes that occur in the valuations of present ownership of durable agents and similar claims to future income. These reactions are accentuated by the mode of operation of the banking and monetary system. In periods of rising prosperity, inflated capitalizations of the prospective gains of ownership are built up, the movement being aggravated to some extent by the misdirection of short-term bank loans. These exaggerated expectations of the future, however, are eventually discredited. In the reaction, the disappearance of profits, falling prices, unemployment, reduced incomes, and the deficiency and maldistribution of purchasing power are the conditions that strike the eye, although they are effects rather than causes. The depth to which a depression may go depends not only on the magnitude of the initial maladjustment, but also upon the institutional conditions that prevent smooth readjustment or contribute to the secondary downward movements of deflation.

THE QUESTION OF REMEDIES

So many of the economic and social problems of modern society are associated with the major business cycle that one inevitably turns from the explanation of the cycle to the quest for a remedy. As might be expected, the adherents of different theories of the cycle differ also in their advocacy of measures to alleviate or eliminate it. Those who hold a single, unified explanation in terms of monetary and credit phenomena urge that the development of a properly functioning

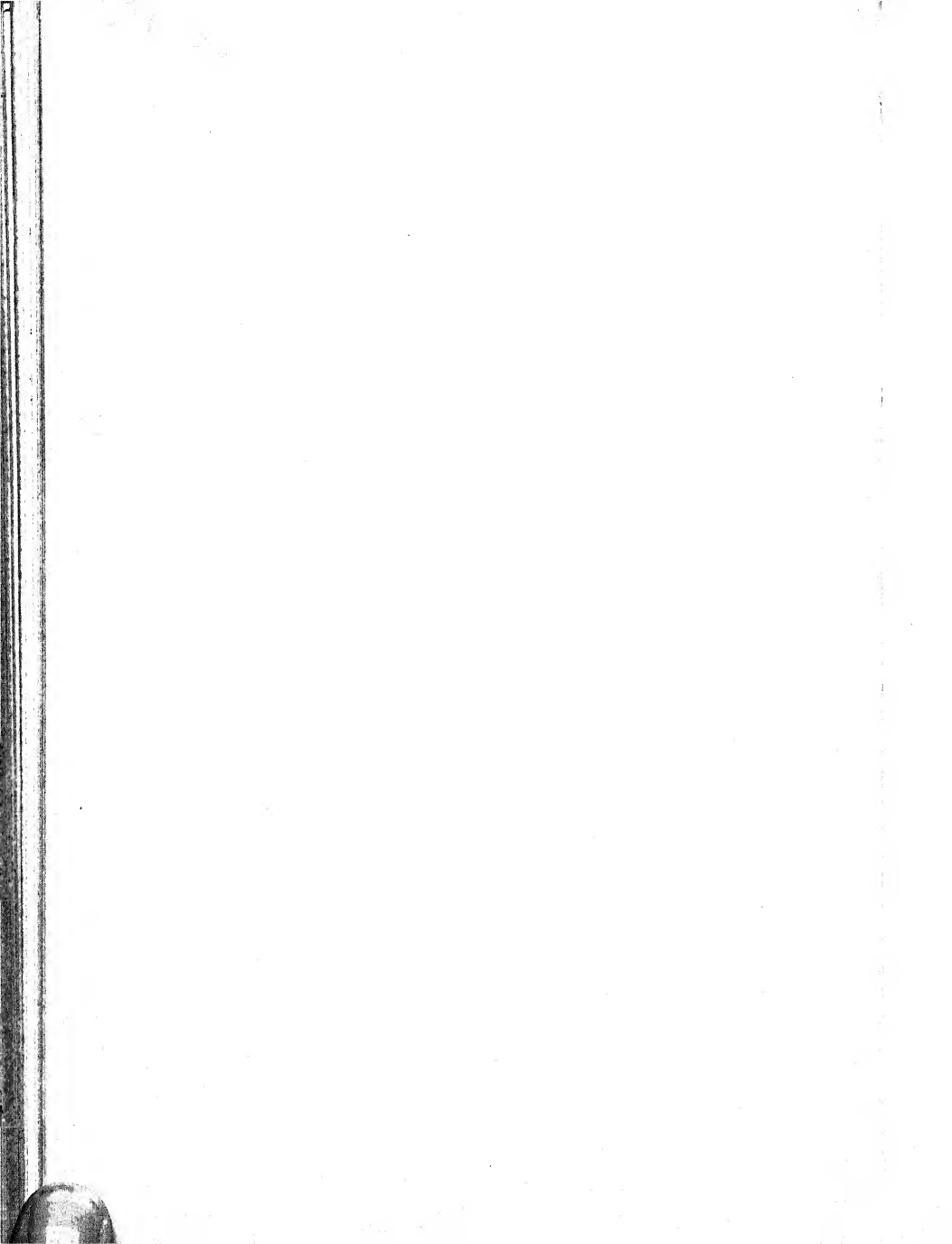
system of banking will cure the cycle. Those who believe that the cycle is due to errors of judgment of competing enterprisers, inherent in the working of the economic system, believe that the development of a planned economy will solve the problem. Those who believe that the business cycle is attributable to improper distribution of purchasing power advocate the redistribution of purchasing power by taxation, by public works, or by inflation, depending upon the particular school of thought to which they belong.

Unfortunately the existing knowledge of the business cycle is so incomplete, and the interpretation of the known facts so varied, that caution should guide the undertaking of any cure. This is especially true because nearly all of the measures that might be employed as "cures" may themselves cause further instability if improperly used or improperly timed. Indeed, to the extent that the business cycle springs from causes external to the economic system, it is perhaps futile to try to remedy it by tinkering with the system. The time and energy might perhaps better be spent in trying to avoid the causes—wars, tariff warfare, imperialism, political and social blundering, and the like.

Yet, even so, it can reasonably be argued that there may be help, and certainly no harm done, if care is exercised in the reformation of some of our economic institutions (such as the banking system) to make them function in ways less conducive to the extreme reactions that now characterize the cycle. The bolstering of economic institutions may be the best way to secure

a more abiding confidence in them. Even if such measures did not cure the cycle, they might help to prevent the great secondary deflations and vicious circles of liquidation that have been associated with business cycles up to the present time.

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